LATROBE LEVEE PROJECT - EPBC 2020/8846

CENTRAL NORTH BURROWING CRAYFISH

SALVAGE AND TRANSLOCATION REPORTING



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ACRONYMS	
CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
DAWE	Department of Agriculture, Water and Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
OMMP	Offset Management and Monitoring Plan (**Attachment 2**)
OS	Offset Site

TERMS	
Approval	The approval made by DAWE dated 6 June 2022 for the Latrobe Levee, Latrobe, Tasmania (EPBC 2020/8846) (**Attachment 1**)
Degraded or Degradation	means a decrease in condition as quantified by the parameters specified in the OMMP (burrow count, habitat erosion, wetness, plantings, sedimentation).
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: River Road and Kings Park (**Figure A4**).
Project	The Latrobe Levee Project (EPBC 2020/8846) which is the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of setdown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.

EXECUTIVE SUMMARY

The Latrobe township is located in the lower Mersey River catchment along the mid-north coast of Tasmania. In 2016, the highest floods on record were experienced in the Mersey River at Latrobe Bridge, which inundated a large area of the township. The severity of the June 2016 flood and the subsequent impact on the Latrobe township led Latrobe Council (LC) to propose the installation of flood mitigation measures for the township.

A levee system was constructed around the township's south-western and southern perimeter, a flood gate structure (lower Kings Creek) and a peak-flow flood diverter on Kings Creek at Kings Park (the 'Project'). The levee system was designed to reduce the risk of flooding from the Mersey River and Kings Creek to the Latrobe township but does not permanently impound water.

A Referral was made to the Department of Agriculture, Water, and the Environment (DAWE, but now DCCEEW) because of the direct and indirect impact to *Engaeus granulatus* (central north burrowing crayfish, CNBC); a species listed as endangered on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Project was assessed by Preliminary Documentation (and received Approval), with the residual impact to CNBC addressed by the establishment of two Offset Sites to where salvaged animals from the works areas would be translocated. Indirect impact monitoring was also required to assess over time the impacts, if any, caused by the levee system's construction and operation.

The two successfully salvaged and translocated animals from the River Road impact area were positively identified as *Engaeus granulatus* by Dr Colin McCoull. The other two were salvaged from near Sammy's Creek (Victor Street) under the Unexpected Discovery Procedure by Treloar Civil and Quarries and BridgePro Engineering – these animals were not identified to species level but are likely to be *Engaeus granulatus*.

The Offset Sites have now been established for 3 years, and both support *Engaeus* that have colonised the area of their own accord. The River Road OS is well advanced with colonisation now observed well in the 'core' of the habitat created, and functionally the vegetation (both existing and planted) is well established. Kings Park is less mature in its habitat with more weed cover and less water available in basins (see below for comments about this), possibly owing to the less native state of that OS when initially established and the variability in water input; however, it is sufficient for *Engaeus* to persist in the habitat created.

Weed control works and some supplementary plantings are required at both Offset Sites to enhance and maintain their habitat values for *Engaeus*, and other species such as eastern barred bandicoot.

The Kings Park OS requires (i) a hole in the second basin to be remedied to ensure the ongoing retention of water and the overflow of retained water into the third basin, and (ii) additional signage to enhance public awareness. The remedial works to fill the hole may require a small machine or hand tools and needs to be done with significant care as the works are within the OS **and** *Engaeus* are present nearby.

The River Road OS requires a bund to be reinstated at the culvert entrance to the site from the roadside drain in Last Street West to ensure a greater flow of water input into the drainage system of the OS. The works are minor and can be undertaken outside the OS.

A new area of *Engaeus* habitat has been created by the Project and impacted areas at Kings Park successfully rehabilitated to once again be suitable *Engaeus* habitat (in addition to the Kings Park OS).

The indirect monitoring of potential impacts from the Project to *Engaeus* and its habitat could cease as the impacts are nil or negligible; we do not consider the habitat to be degraded within the meaning of the Approval. To the contrary, the habitat being monitored is either unchanged or better for *Engaeus*.

PART A - INTRODUCTION

A.1 Project Background

A levee system (the Project) was constructed at Latrobe to reduce the risk of flooding from the Mersey River and Kings Creek to the township of Latrobe (**Figures A1 and A2**). These water courses flow past and through the town respectively (**Figure A2**). The levee system was built around Latrobe township's south-western and southern perimeter as well as a flood gate structure (lower Kings Creek) and a peak-flow flood diverter (underground culvert system) on Kings Creek at Kings Park (**Figure A3**).

The Project caused a direct impact to the central north burrowing crayfish (CNBC, *Engaeus granulatus*) which is listed as endangered on the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Project was approved by DAWE (now DCCEEW) with conditions (**Attachment 1**). The salvage and translocation of CNBC from the impact areas to Offset Sites (**Figure A5**) was required by the Approval.

Detailed site surveys and assessments for CNBC and the impact the Project was likely to have on the species showed a direct impact to 66 burrows for the three CNBC Impact Areas at Kings Park, River Road, and Victor Street (**Figure A5**; see **Table 1**), and up to 0.064 hectares of habitat loss (VDC 2021).

Table 1. Habitat and burrows of central north burrowing crayfish directly lost by the Project

CNBC Impact Area	Habitat Loss (square metres)	Burrows Lost (number)	Burrow density (number/m^2)
River Road	287.48	47	0.09
Kings Park	301.67	13	0.04
Victor Street	46.67	1	0.02
TOTAL	**635.82**	**66**	

As a requirement of the Approval, CNBC were planned to be salvaged and translocated from the Project Impact Areas to the Offset Sites (see **Figure A5**) – those CNBC near River Road were to be translocated to the River Road Offset Site and those at Kings Park and Victor Street were to be translocated to the Kings Park Offset Site.

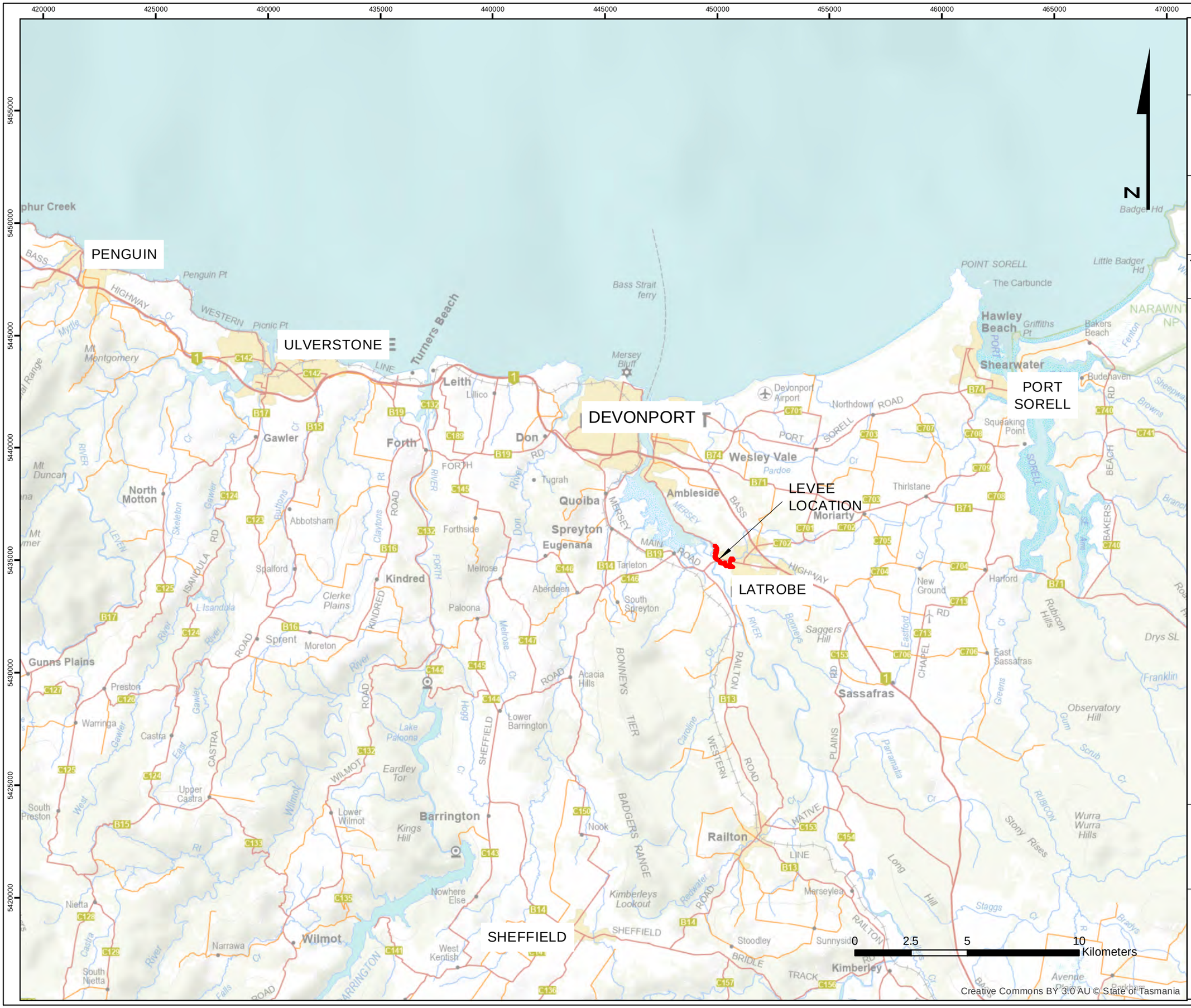
The design and method of habitat creation at each Offset Site is the subject of this *Offset Management and Monitoring Plan* (OMMP; Latrobe Council 2022). The salvage and translocation methodology for CNBC is described in the OMMP (**Attachment 2**).

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EPBC COMPLIANCE MONITORING REPORT

Figure A1: Location of Latrobe township in central north Tasmania

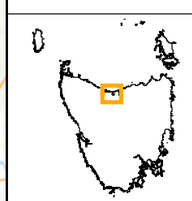
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DATE: 15 OCT 2025

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MERSEY RIVER

DOOLEYS HILL

PIG ISLAND

KINGS CREEK

KINGS CREEK

LATROBE TOWNSHIP

GILBERT STREET

SAMMYS CREEK (DRAIN)

MERSEY RIVER

MERSEY RIVER

BONNEYS CREEK

BASS HWY

LOCHNER STREET

TWISS STREET

VICTOR STREET NORTH

HAWKINS STREET WEST

HAWKINS STREET

MORIARTY ROAD

FORTH STREET

EAST FORTH STREET

LAST STREET WEST

MADELINE STREET

GILBERT ST

HAMPDEN STREET

GILBERT STREET

GEORGE STREET

COTTON STREET

THOMAS STREET

ALBERTA STREET

FENTON STREET

GERRAND STREET

REIBEY STREET

BENNY STREET

CALTHORPE STREET

MAPLE STREET

ELM STREET

ASH STREET

PAULOWNIA ST

MAGNOLIA AVENUE

LAST STREET

SHAW STREET

HENRY STREET

STANLEY STREET NORTH

STANLEY STREET SOUTH

PERCIVAL STREET

WILLIAM STREET

VICTOR STREET

HICKS LANE

BRADSHAW STREET

MONAGHAN ST

TORQUAY ROAD

PARLIE ST

MOUNTAIN VIEW RISE

VENTNOR PL

SPRING GROVE

LYELL STREET

CHERRY HILL ROAD

ROBERT STREET

SCULLY ST

JOSEPH STREET

COOPE STREET

LAURA STREET

LAURA STREET STH

JAMES STREET

LEWIS STREET

BRADSHAW STREET

HAMILTON STREET

NEW STREET

READY PLACE

HARLEY CT

THE AVENUE

WALDOLE CRES

PERRIN COURT

Bells Parade

Thompson Park

Police Paddock

Sheean Walk

Allison Park

Miles Ford Bridge

FROGMORE LANE

MILLRACE

RAILTON ROAD

BALLAHOO ROAD

COAL HILL ROAD

WESTERN LINE

Latrobe Cemetery

Parking

St Georges Park

Latrobe Speedway

Latrobe Go Karts

training track

drain

Creek

Kings Creek

Latrobe Creek

B19

C702

C417

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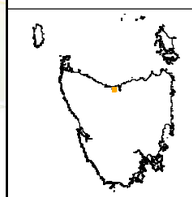
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Figure A2: Latrobe township showing key locations and features

TASMAP:	LGA:
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MERSEY RIVER

PIG ISLAND

MERSEY RIVER

LATROBE TOWNSHIP

KINGS CREEK

MILES FORD BRIDGE

Flood Gate

GILBERT STREET

KINGS CREEK

Kings Creek flood diversion culvert

SAMMYS CREEK (DRAIN)

MERSEY RIVER

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Figure A3: Latrobe Levee As-Built Infrastructure / Impact Area

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A.2 Approval and conditions

This Report is concerned with the post 6-week monitoring required by the Approval, and compiles the data collected during monitoring events.

Specifically, the Conditions of relevance to this Report are reproduced below –

8. The approval holder must implement the **OMMP.**

9. To adequately monitor the success of the **OMMP,** the approval holder must engage a **suitably qualified ecologist** to:

    a. Conduct **burrow counts** and **photopoint monitoring** of the **translocation areas** within 24 hours after the completion of **salvage** and **translocation**, and at 2, 6, 12, and 26 weeks after the completion of **translocation.**

    b. Conduct **burrow counts** and **photopoint monitoring** of the **offset areas** at 6, 12, 36, 52 weeks after the completion of **salvage** and **translocation**, and then once every 12 months until five years after the **completion criteria** are met.

    c. Conduct **burrow counts** and **photopoint monitoring** at burrows and **Central North Burrowing Crayfish habitat** within the **indirect impact monitoring areas** one week prior to the **commencement of the action**, at 1, 36 and 52 weeks after the completion of **construction**, and then once every 12 months for 3 years**.**

10. If **Central North Burrowing Crayfish** burrows or **Central North Burrowing Crayfish habitat** within the **indirect impact monitoring areas** are found to be **degraded**, the approval holder must, within two months of such detection, submit to the **department** for the **Minister**'s approval, a revised version of the **OMMP** describing the extent and cause of the **degradation** and proposed contigency actions (if necessary) to ensure that within 2 years, the **Central North Burrowing Crayfish burrow counts** and **Central North Burrowing Crayfish habitat** return to their condition prior to **commencement of the action**.

        i. If within two months of submission of the revised **OMMP** to the **department,** the revised version of the **OMMP** is found to be inadequate by the **Minister**, the **Minister** may appprove a version of the **OMMP** revised by the **department.** The approval holder must then implement the approved **OMMP** for the remainder of the life of this approval.

A.3 Objectives

The objectives of this Report are to provide:

- background information about the Offset Sites established as part of the Project, and
- the required information and comments to meet Conditions 8, 9 and 10 of the Approval EPBC 2020/8846.

A.4 Offset Establishment and *Engaeus* Translocation

The salvage and translocation process was directly related to the establishment of Offset Sites to where CNBC were to be translocated. The locations of the Offset Sites are shown in **Figure A4.**

A previous report (VDC 2023, **Attachment 2**) was prepared and submitted to DCCEEW to satisfy Condition 7 of the Approval.

Location and Tenure

The Offset Sites – River Road and Kings Park (**Figures A4 and A5**) – were chosen after careful consideration of the land tenure and long-term security prospects of the site, potential for habitat at the site to be enhanced and/or habitat areas created and sustained for the long-term for CNBC and the quantum of the residual impact needing to be offset. **Table 2** provides details of the address and tenure at each Offset Site.

Table 2. Offset Site location and land tenure

Attribute	Offset Site 1	Offset Site 2
Reference Name	River Road Offset	Kings Park Offset
Physical Address	RIVER RD LATROBE TAS 7307	HAMILTON ST LATROBE TAS 7307
Access	Last Street West	Kings Lane and Kings Park
Certificate of Title (PID)	223225/1, 153484/1, 46134/7, 233419/1 (3170515)	25603/7 (6537888)
Landowner	Latrobe Council	Latrobe Council

River Road Offset Site establishment works

The Offset Site is located on the junction of River Road and Last Street West, with an existing access from Last Street West. The location has been used for the temporary housing of horses by those participating in the Tasmanian Trail – Latrobe is on the route from Devonport to Dover.

The Offset Site was established by 6 September 2022, and CNBC translocated to it on 9 December 2022.

Kings Park Offset Site establishment works

The Offset Site at Kings Park has several stormwater inputs and is a naturally damp area with shallow topographic depressions adjacent to Kings Creek (so water table is not very deep) and there is opportunity to deepen the existing water pooling areas.

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MERSEY RIVER

PIG ISLAND

River Road Offset Site (See Fig D1

Kings Park Offset Site (See Fig C1

KINGS CREEK

LATROBE TOWNSHIP

MERSEY RIVER

MILES FORD BRIDGE

GILBERT STREET

KINGS CREEK

SAMMYS CREEK (DRAIN)

MERSEY RIVER

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Figure A4: Offset Site locations relative to As-Built Infrastructure

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Monitoring Areas

Habitat Loss Area

Offset Areas

MERSEY RIVER

PIG ISLAND

Bells Parade Potential Monitoring Area

River Road Offset Site (See Fig D1

Kings Park Offset Site (See Fig C1

KINGS CREEK

LATROBE TOWNSHIP

MERSEY RIVER

MILES FORD BRIDGE

GILBERT STREET

KINGS CREEK

Kings Creek Potential Monitoring Area

Sammys Creek Potential Monitoring Area

SAMMYS CREEK (DRAIN)

MERSEY RIVER

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Figure A5: Indirect impact monitoring areas for CNBC burrows and habitat

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Plate 1. Works conducted during the establishment of drainage and plants at the River Road Offset Site



Plate 2. Works conducted during the establishment of drainage and plants at the Kings Park Offset Site



Salvage and Translocation

Four *Engaeus* animals were salvaged and translocated successfully from the impact areas of the Project. None were euthanised and none died during the salvage and translocation. The two successfully salvaged *Engaeus* translocated to the River Road site were positively identified as *Engaeus granulatus* by Dr McCoull.

The other two *Engaeus* animals were salvaged from near Victor Street under the Unexpected Discovery Procedure by Treloar Civil and Quarries and BridgePro Engineering – these animals were not identified to species level but are likely to be *Engaeus granulatus* or could be the newly described species *E. excavator*. Excavation works by Treloar's uncovered an unknown culvert system in the paddock to the north of Sammys Creek. The location was not in the impact area at Victor Street and the culvert was not expected to be in that area.

Table 3 provides a summary of the CNBC salvaged and translocated for each of the three impact sites.

Table 3. Central north burrowing crayfish salvaged and translocated in the Project

CNBC Impact Area	CNBC successfully salvaged	CNBC successfully translocated	CNBC euthanised during salvage and translocation	CNBC died during salvage and translocation
River Road	2	2	0	0
Kings Park	0	0	0	0
Victor Street	2	2*	0	0
TOTAL	**4**	**4**	**0**	**0**

* These animals were salvaged and translocated under the Unexpected Discovery procedure by Treloar Transport and BridgePro staff, so their identification was not conducted.

PART B – KINGS PARK OFFSET MONITORING

The Kings Park Offset Site was established to receive *Engaeus* from the Kings Park and Sammys Creek (Victor Street) – see **Figure A5. Plate 4** provides photopoint images from selected time periods.

B.1 *Engaeus* burrow number, location, and form

The following information and photographs are provided to document the number and location of Engaeus burrows over the course of the 3 years of monitoring.

Pre-development and translocation

The Offset Site was found to support 16 *Engaeus* burrows (**Figure C1**) prior to any works or translocation of *Engaeus* to the Offset Site (November 2021). Two *Engaeus* were translocated to the Offset Site, and at that time no other burrows were observed.

12 weeks

The Offset Site was found to support 8 *Engaeus* burrows (**Figure C2**), which did not include the burrows created to receive the translocated *Engaeus* – these burrows had been inundated by surface water several times since they were created and were no longer visible. The site was dry when assessed after 12 weeks (survey done in March 2023). Images are provided below of the Offset Site.









36 and 52 weeks

The same 8 *Engaeus* burrows observed at 12 weeks (**Figure C2**) were observed at both the 36- and 52-week monitoring events. Images are provided below of the Offset Site at 36 and 52 weeks.

36 weeks (August 2023)






52 weeks (December 2023)








2 years

The Offset Site was found to support 2 *Engaeus* burrows (**Figure C2**). The retaining wall (as foreshadowed in table 10 of the OMMP) was installed for one adjacent lot. There was little change in the site between 52 weeks to 2 years in terms of vegetation growth/change, so Year 2 images have been omitted from **Plate 4** due to space limitations.

3 years

The survey was conducted 2 years and 9 months after translocation (but 3 years after Offset Site establishment) to maximise detectability during a wetter period. It has been found that assessments done during the summer months, and even extending into autumn, can be misleading of the number and location of *Engaeus* burrows (i.e., burrows can be 'invisible' during dry periods).

The Offset Site was found to support 12 *Engaeus* burrows (**Figure C2**), with a further two burrows in proximity to the Offset Site. Recent rains and the associated flows in Kings Creek had removed any chimneys along Kings Creek and filled in the holes – no *Engaeus* burrows were observed along Kings Creek itself, however they are likely to be present.

The following images show the Offset Site at Year 3.







Most of the burrows observed at Year 3 had a chimney and were obvious when not surrounded by or occurred within vegetation. Several chimneys were observed around and within the *Poa* tussocks and some in *Carex;* this was expected to occur because the tussocks and sedges provide shelter from predation and desiccation and provide support to the establishment of a chimney.

The chimneys varied in size, with small holes and associated early chimney development observed which suggests the use of the site by small animals, possibly young animals.

Plate 3 provides images of the burrow types and form in the Offset Site, with the last two images showing the burrows/chimneys observed within *Poa* tussocks.

Plate 3. Images of *Engaeus* burrows observed at Year 3 in the Kings Park Offset Site



Plate 4. Photopoint images of Kings Park Offset Site at 36 and 52 weeks, and 3 years after establishment

36 WEEKS	52 WEEKS (YEAR 2 COMPARABLE TO 52 WEEKS)	3 YEARS
		
		

36 WEEKS	52 WEEKS (YEAR 2 COMPARABLE TO 52 WEEKS)	3 YEARS
		
		



LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure C1: Engaeus burrows at Offset Site 2 – Kings Park
Nov 2021 - Pre-development

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
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DATE: 15 OCT 2025

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EPBC COMPLIANCE MONITORING REPORT

Figure C2: Engaeus burrows at Offset Site 2 – Kings Park Translocated Animals - Dec 2022

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

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LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure C3: Engaeus burrows at Offset Site 2 – Kings Park Feb 2023 - Week 12

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

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DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
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DATE: 15 OCT 2025

450740
450760
450780
5435080
5435060
5435040
0 5 10 20 Meters
N
KINGS CREEK
KINGS CREEK
Kings Park
Offset Site
Burrows
NEW
CONCRETE
WALL
CONSTRUCTED
Engaeus Burrows
Creative Commons BY-NC-ND 3.0 AU © State of Tasmania

LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure C4: Engaeus burrows at Offset Site 2 – Kings Park
Feb 2025 - Approx Year 2

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING

DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

450740 450760 450780

5435080 5435060 5435040

0 5 10 20 Meters

N

KINGS CREEK

KINGS CREEK

Kings Park
Offset Site

Drainage
Leak to River
(To Fix)

Burrows

Burrow

NEW
CONCRETE
WALL
CONSTRUCTED

Observed Engaeus Burrows - Sept 2025

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LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure C5: Engaeus burrows at Offset Site 2 – Kings Park
Sept 2025 - 2 Years 9 Months

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

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LATROBE COUNCIL

DATE: 15 OCT 2025

B.2 Management Actions in OMMP

The establishment and successful management of the Offset Site is contingent on the implementation of key actions, some of which are unique to one of the sites only.

Table 4 provides a list of the management actions and timing for the installation and maintenance of the Offset Sites with notes about the status of the task at the Year 3 assessment.

Table 4. Audit of management plan actions and timing for Kings Park Offset Site

OMMP ITEM	OMMP Action	OMMP Timing	Task Status at Year 3
LAND ZONING AND ASSET REGISTER	Maintain Open Space zoning List Offset Site in Asset Register	Ongoing from Approval	Zoning maintained Asset listed in Asset Register
EARTHWORKS	Conduct earthworks to install low-lying areas for water ponding. Install minor blockages to drains.	At least 14 days before CNBC are translocated to the site	Completed
PLANTINGS	Plant tubestock and protect from herbivory as required.	At least 7 days before CNBC are translocated to the site	Completed
FENCING			NA
RETAINING WALL	Build retaining wall on southern boundary.	To be built before or concurrent to the earthworks for drainage improvements	Retaining wall completed
SIGNAGE	Establish signage to advise the public of the Project and the sensitivities of the Offset Site	At least 14 days before CNBC are translocated to the site	Established at entrance to Kings Park
	Establish permanent interpretative signage	Within 2 months of CNBC being translocated	**Not yet established at Offset Site**
WEED CONTROL	Control three-cornered garlic and other weeds	Initial weed control within 3 months of earthworks being	

		completed and then ongoing as required	**Weed control works are not sufficient to control three-cornered garlic**
	Weed assessment survey for control works program	Every 12 months from CNBC being translocated	
	Implementation of weed control program	As guided by the weed assessment survey	
COMMUNICATIONS	Provide the OMMP on the LC webpage in addition to information about the Project and the importance of the Offset Sites to the success of the Project	At least 14 days before CNBC are translocated to the site	**Not yet posted to LC webpage**
	Liaise with adjacent landowners about the Project and the Offset Sites		Completed
	Advise the community of the Offset Site and its intended aims of protecting and preserving CNBC		Completed

B.3 Compliance assessment for OMMP Management Constraints

The OMMP identified several post-construction management constraints and measures to be applied at the Offset Site. An audit/assessment of compliance against each of the matters listed in Table 9 of the OMMP is provided in **Table 5.**

Table 5. Audit of management constraints and measures for the Kings Park Offset Site

LAND USE	LAND MANAGEMENT ACTIVITY/TASK DESCRIPTION	COMPLIANCE ASSESSMENT
STOCK GRAZING	Livestock prohibited.	Compliant; no evidence of stock grazing
FUEL REDUCTION AND ECOLOGICAL BURNS	Fire is not a necessary management tool.	Compliant; no fires have occurred.

CAMPFIRE(S)	Not permitted.	
FIREBREAKS	Very unlikely to be required. Firebreaks must be approved by DAWE prior to installation.	Compliant; no firebreaks established.
HERBICIDES, PESTICIDES, FERTILISERS AND OTHER CHEMICALS	Herbicides may be used as part of a weed management program strictly in accordance with the manufacturer's specifications. No fertilisers or pesticides are to be applied.	Compliant; no fertilisers or pesticides have been applied.
CONTROL OF EXOTIC PLANT SPECIES (WEEDS)	Annual inspections with the control and (if possible) eradication of Declared and environmental weeds to achieve the Completion Criteria.	**Not compliant; weed control works are required (three cornered garlic is now widespread and prolific)**
CONTROL OF EXOTIC (FERAL) ANIMAL SPECIES	No relevant, feral animals are unlikely to be a management issue.	Not a management issue
CONTROL OF NATIVE ANIMALS	Not permitted.	Compliant; no firebreaks established.
DOGS IN THE OFFSET SITE?	Dogs are permitted if under effective control.	Unknown; no dogs observed during assessments.
INTRODUCTION OF NATIVE FLORA FOR THE PURPOSE OF REVEGETATION	Permitted in accordance with the OMMP and subsequent advice/authorisations.	Compliant; plants have been introduced to revegetate the site as per the OMMP.
TAKING OF WATER FOR DOMESTIC USE	Not permitted.	Compliant; no water being taken.
NATURAL FLOW OF WATER	Minor interference with the natural flow of water is permitted where it is associated with existing enhancing the habitat created for CNBC.	Compliant; no water interference other than what was done when the site was established.
EFFLUENT AND IRRIGATION	The use of irrigation water or effluent is prohibited.	Compliant; irrigation and effluent not being discharged to site.
EXISTING VEHICLE OR FORMED WALKING TRACKS?	No.	NA
VEHICLE TRACKS	No carriageways are permitted.	Compliant; carriageways are not installed.
WALKING TRACKS	Wooden footbridge sections may be installed at the northern side of the Offset Site (**Attachment**	NA; a footbridge has not been installed at this stage and may not be installed (it

	5), adjacent to Kings Creek (on the high points in the Offset Site).	is not a mandatory requirement for the Offset Site).
VEHICLE USE	Vehicle use only permitted for - • To assist with approved maintenance activities • To assist with weed control activities	Compliant; vehicles do not appear to enter the site.
OFF-ROAD VEHICLE USE	Not permitted.	Compliant; vehicles do not appear to enter the site.
RECREATIONAL USE AND DELETERIOUS ACTIVITIES	Recreational activities that are not considered deleterious to the natural values are permitted on the land. No activities (including, but not confined to removal of natural resources, dumping of rubbish, general disturbance etc) which are or may be deleterious to the natural values are not permitted.	Compliant; site is irregularly used by visitors to walk through Kings Park.
CONSTRUCTION OF INFRASTRUCTURE (EXCLUDING FENCING)	LC may install and maintain mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation. Wooden footbridge sections may be installed at the northern side of the Offset Site (**Attachment 5**), adjacent to the Kings Creek (on the high points in the Offset Site) for walkers to traverse the area without interference to the CNBC habitat. No toilets or other effluent creating amenities will be constructed in the Offset Site.	NA; a footbridge and picnic tables have not been installed, and they may not be installed (it is not a mandatory requirement for the Offset Site).
INTRODUCTION OF FOREIGN MATERIALS	Introduction of foreign materials (e.g., gravel, rock, woody debris) is only permitted for the maintenance of infrastructure (tracks, etc.) or for remedial/enhancement works associated with the CNBC habitat.	Compliant; materials brought in are associated with the rehabilitation and management of the site, such as tubestock plantings.
MONITORING	The installation of star pickets and associated monitoring plot infrastructure such as pegs, and tape is permitted. Transect markers and monitoring plots/quadrat markers may be installed as part of the monitoring program.	NA; h hard infrastructure for monitoring has not been installed because it has not been considered necessary by the suitably qualified ecologists conducting the site monitoring required by the Approval.

B.4 Management Issues and Actions

The assessments at the 3-year period, identified several management issues which need to be tackled to ensure the ongoing viability of the Offset Site for CNBC. Information is provided below for each of the 4 matters identified from the audit that need remedial works undertaken, or the task to be completed, which are further summarised in **Table 6.**

Leakage of second basin

The second basin, which is located at the northern side of the Offset Site, receives water from the first basin, and then overflows to the third basin which then drains to Kings Creek – the third basin is blocked by a rock lined clay wall. The second basin fills partly, but then water drains to a hole that has opened on its northern side, adjacent to the bund wall covered with *Poa labillardierei*.

Water was observed during the assessment to flow across the first basin, and into the second, but then it drains through a hole that has opened in the northern side of the basin. The leakage causes water to drain, which prevents it from spilling to the thrid basin and then overflow to Kings Creek at the rock-lined clay wall. The arrows in the images below show the hole, which can be seen by removing the covering leaves. The cause of the hole formation is unknown.



Weed infestation

Three-cornered garlic has become prolific in the past 12 months, especially under the elms at the eastern side of the Offset Site, and it also occurs sporadically throughout the site on the mounds created and planted with *Poa* and *Carex*.

The images below show the dense patches of the weed in the eastern section of the Offset Site, and more sporadic occurrences of it in the remainder, especially where grass has established. It doesn't grow in the very wet areas, and those areas that are inundated for longer periods.






Loss of plantings

There has been the loss of several plantings throughout the site, mainly of *Poa labillardierei* (silver tussock grass) planted on the central mounds created from the excavation of the basins to increase the longevity of water lie. The losses are likely due to periods of dry. The value of the *Poa* tussocks to the CNBC is evident from the use of them to support chimneys, and the shade/cover they create from predation and desiccation.

Signage

Signage has been erected at the car park of Kings Park, which is the main entrance to the park. The existing sign advises park users of the presence of the CNBC, but not specifically of the Offset Site being managed for its persistence in the area. Additional signage needs to be erected at the western and eastern sides of the Offset Site to achieve this objective as per the OMMP.

Table 6. Management issues and recommended actions for the Kings Park Offset Site

Management Issue	Action	Timing for completion
Leak in second basin	Fix leak using clay or similar	Mid-November 2025
Spread of three-cornered garlic	Weed spraying	Early-November 2025
Loss of some plantings, especially *Poa* tussocks	Additional plantings of *Poa labillardierei*	Winter 2026
Signage	Add signage	Late November 2025

PART C – RIVER ROAD OFFSET SITE MONITORING

The River Road Offset Site was established to receive *Engaeus* from the River Road sections of the impact area – see **Figure A5. Plate 6** provides photopoint images from selected time periods.

C.1 *Engaeus* burrow number, location, and form

The following information and photographs are provided to document the number and location of Engaeus burrows over the course of the 3 years of monitoring.

Pre-development and translocation

The Offset Site was found to support no *Engaeus* burrows (**Figure D1**) prior to any habitat creation works or the translocation of *Engaeus* to the Offset Site (November 2021). Two *Engaeus* were translocated to the Offset Site, and at that time no other burrows were observed in the Offset Site (**Figure D-2**). Numerous burrows exist and have existed for many years based on repeated observations, in the drainage system around River Road and Last Street West (See **Figure D-1**).

12 weeks

The Offset Site was found to support 1 active *Engaeus* burrow – one of the burrows created and used to translocate an *Engaeus*. The site was generally dry when assessed after 12 weeks (survey done in March 2023). Images are provided below of the Offset Site.









36 and 52 weeks

The same active *Engaeus* burrow observed at 12 weeks was observed to be active (evidence of dirt movement, maintenance of burrow structure) at both the 36- and 52-week monitoring events. Images are provided below of the Offset Site at 36 and 52 weeks.

36 weeks (August 2023)












52 weeks (December 2023)











2 years

The same active *Engaeus* burrow observed at 12, 36 and 52 weeks was observed to be active (i.e. there was evidence of dirt movement, maintenance of burrow structure) (**Figure D4**). The *Engaeus* burrows observed and mapped in the roadside drainage system of Last Street West and River Road did not extend into the site. There was little change in the site between 52 weeks to 2 years in terms of vegetation growth/change, so Year 2 images have been omitted from **Plate 6** due to space limitations.

3 years

The survey was conducted 2 years and 9 months after translocation (but 3 years after Offset Site establishment) to maximise detectability during a wetter period. It has been found that assessments done during the summer months, and even extending into autumn, can be misleading of the number and location of *Engaeus* burrows (i.e., burrows can be 'invisible' during dry periods).

The Offset Site was found to support 8 *Engaeus* burrows (**Figure D5**) which includes the single *Engaeus* burrow that has remained active since translocation in December 2022. The *Engaeus* burrows observed and mapped in the roadside drainage system of Last Street West and River Road did not extend into the site.

The following images show the Offset Site at Year 3.










Most of the burrows observed at Year 3 had a chimney and were obvious when not surrounded by or occurred within vegetation. Several chimneys were observed around and within the *Poa* tussocks and *Carex;* this was expected to occur because the tussocks and sedges provide shelter from predation and desiccation and provide support to the establishment of a chimney. A comparable trend was observed at the Kings Park Offset Site (see **Plate 3**). A few chimneys were fully exposed, within non-native pasture grass cover.

The chimneys varied in size, with small holes and associated early chimney development observed which suggests the use of the site by small animals, possibly young animals.

Plate 5 provides images of the burrow types and form in the Offset Site.

Plate 5. Images of *Engaeus* burrows observed at Year 3 in the River Road Offset Site







Plate 6. Photopoint images of River Road Offset Site at 36 and 52 weeks, and 3 years after establishment

36 WEEKS	52 WEEKS (YEAR 2 COMPARABLE TO 52 WEEKS)	3 YEARS
		
		

36 WEEKS	52 WEEKS (YEAR 2 COMPARABLE TO 52 WEEKS)	3 YEARS
		
		

36 WEEKS	52 WEEKS (YEAR 2 COMPARABLE TO 52 WEEKS)	3 YEARS
		

449950
450000
450050
5435400
5435350
5435300
Engaeus Burrows
River Road
0
12.5
25
50
Meters
N
River Road
Offset Site
Burrow
Last Street West
Creative Commons BY-NC-ND 3.0 AU © State of Tasmania

LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure D1: Engaeus burrows at Offset Site 1 - River Road
Nov 2021 - Pre-development

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

449950
450000
450050
5435400
5435350
5435300

Translocated Engaeus

0 12.5 25 50 Meters

N

River Road

River Road
Offset Site

Translocated
Engaeus

Last Street West

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LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure D2: Engaeus burrows at Offset Site 1 - River Road Translocated Animals - Dec 2022

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

449950
450000
450050
5435400
5435350
5435300

Engaeus Burrows

0 12.5 25 50 Meters

N

River Road

River Road
Offset Site

Burrow

Last Street West

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LATROBE LEVEE PROJECT

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Figure D3: Engaeus burrows at Offset Site 1 - River Road
Feb 2023 - Week 12

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING

DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

449950
450000
450050
5435400
5435350
5435300

Engaeus Burrows

0 12.5 25 50 Meters

N

River Road

River Road
Offset Site

Burrow

Last Street West

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EPBC COMPLIANCE MONITORING REPORT

Figure D4: Engaeus burrows at Offset Site 1 - River Road
Feb 2025 - Approx Year 2

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

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DATE: 15 OCT 2025

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EPBC COMPLIANCE MONITORING REPORT

Figure D5: Engaeus burrows at Offset Site 1 - River Road
Sept 2025 - 2 Years 9 Months

TASMAP:	LGA:
LATROBE	LATROBE

449950
450000
450050
5435400
5435350
5435300

Observed Engaeus Burrows Sept 2025

0 12.5 25 50 Meters

N

River Road

River Road Offset Site

Burrows

Last Street West

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Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

C.2 Management Actions in OMMP

The establishment and successful management of the River Road Offset Site is contingent on the implementation of key actions, some of which are unique to one of the sites only.

Table 7 provides a list of the management actions and timing for the installation and maintenance of the Offset Sites with notes about the status of the task at the Year 3 assessment.

Table 7. Audit of management plan actions and timing for the River Road Offset Site

OMMP ITEM	OMMP Action	OMMP Timing	Task Status at Year 3
LAND ZONING AND ASSET REGISTER	Maintain Open Space zoning List Offset Site in Asset Register	Ongoing from Approval	Zoning maintained Asset listed in Asset Register
EARTHWORKS	Conduct earthworks to install low-lying areas for water ponding. Enhance drains directing water to wet areas.	At least 14 days before CNBC are translocated to the site	Completed
PLANTINGS	Plant tubestock and protect from herbivory as required.	At least 7 days before CNBC are translocated to the site	Completed
FENCING	Install personal access gate into southern fence	Within 1 month of earthworks being completed	Completed
	Establish horse-proof fencing on eastern perimeter of site to connect to existing fencing around western and southern perimeter.	Established prior to CNBC being translocated	Completed
SIGNAGE	Establish signage advising the public of the Project and the sensitivities of the Offset Site	At least 14 days before CNBC are translocated to the site	Established at entrance to Offset Site
	Establish permanent interpretative signage	Within 2 months of CNBC being translocated	Completed

WEED CONTROL	Control weeds	Initial weed control within 3 months of earthworks being completed and then ongoing as required	**Weed control works are not sufficient to control three-cornered garlic**
	Weed assessment survey for control works program	Every 12 months from CNBC being translocated	
	Implementation of weed control program	As guided by the weed assessment survey	
COMMUNICATIONS	Provide the OMMP on the LC webpage in addition to information about the Project and the importance of the Offset Sites to the success of the Project	At least 14 days before CNBC are translocated to the site	**Not yet posted to LC webpage**
	Advise the Tasmanian Trail Association of the change in land access and the area available for horse agistment		Completed
	Liaise with adjacent landowners about the Project and the Offset Sites		Completed
	Advise the community of the Offset Site and its intended aims of protecting and preserving CNBC		

C.3 Compliance assessment for OMMP Management Constraints

The OMMP identified several post-construction management constraints and measures to be applied at the Offset Site. An audit/assessment of compliance against each of the matters listed in Table 9 of the OMMP is provided in **Table 8.**

Table 8. Audit of management constraints and measures for the River Road Offset Site

LAND USE	LAND MANAGEMENT ACTIVITY/TASK DESCRIPTION	COMPLIANCE ASSESSMENT
STOCK GRAZING	Livestock prohibited.	Compliant; no evidence of stock grazing
FUEL REDUCTION AND ECOLOGICAL BURNS	Fire is not a necessary management tool.	Compliant; no fires have occurred.
CAMPFIRE(S)	Not permitted.	
FIREBREAKS	Very unlikely to be required. Firebreaks must be approved by DAWE prior to installation.	Compliant; no firebreaks established.
HERBICIDES, PESTICIDES, FERTILISERS AND OTHER CHEMICALS	Herbicides may be used as part of a weed management program strictly in accordance with the manufacturer's specifications. No fertilisers or pesticides are to be applied.	Compliant; no fertilisers or pesticides have been applied.
CONTROL OF EXOTIC PLANT SPECIES (WEEDS)	Annual inspections with the control and (if possible) eradication of Declared and environmental weeds to achieve the Completion Criteria.	**Not compliant; weed control works are required (three cornered garlic is now widespread and prolific).**
CONTROL OF EXOTIC (FERAL) ANIMAL SPECIES	No relevant, feral animals are unlikely to be a management issue.	Not a management issue.
CONTROL OF NATIVE ANIMALS	Not permitted.	Compliant; no firebreaks established.
DOGS IN THE OFFSET SITE?	Dogs not permitted.	Unknown; no dogs observed during assessments.
INTRODUCTION OF NATIVE FLORA FOR THE PURPOSE OF REVEGETATION	Permitted in accordance with the OMMP and subsequent advice/authorisations.	Compliant; plants have been introduced to revegetate the site as per the OMMP.

TAKING OF WATER FOR DOMESTIC USE	Not permitted.	Compliant; no water being taken.
NATURAL FLOW OF WATER	Minor interference with the natural flow of water is permitted where it is associated with existing enhancing the habitat created for CNBC.	Compliant; no water interference other than what was done when the site was established.
EFFLUENT AND IRRIGATION	The use of irrigation water or effluent is prohibited.	Compliant; irrigation and effluent not being discharged to site.
EXISTING VEHICLE OR FORMED WALKING TRACKS?	No.	NA
VEHICLE TRACKS	No carriageways are permitted.	Compliant; carriageways are not installed.
WALKING TRACKS	A walking path may be installed and maintained on higher ground at the southern end of the Offset Site for walkers to traverse the area without interference to the CNBC habitat.	NA; a footbridge has not been installed at this stage (it is not a mandatory requirement for the Offset Site), and may not be installed.
VEHICLE USE	Vehicle use only permitted for - • To assist with approved maintenance activities • To assist with weed control activities	Compliant; vehicles do not appear to enter the site.
OFF-ROAD VEHICLE USE	Not permitted.	Compliant; vehicles do not appear to enter the site.
RECREATIONAL USE AND DELETERIOUS ACTIVITIES	Recreational activities that are not considered deleterious to the natural values are permitted on the land. No activities (including, but not confined to removal of natural resources, dumping of rubbish, general disturbance etc) which are or may be deleterious to the natural values are not permitted.	NA; walking path and picnic tables have not been installed.
CONSTRUCTION OF INFRASTRUCTURE (EXCLUDING FENCING)	LC may install and maintain mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation. No toilets or other effluent creating amenities will be constructed in the Offset Site.	NA; walking path and picnic tables have not been installed.

	A walking path may be installed and maintained on higher ground at the southern end of the Offset Site for walkers to traverse the area without interference to the CNBC habitat.	
INTRODUCTION OF FOREIGN MATERIALS	Introduction of foreign materials (e.g., gravel, rock, woody debris) is only permitted for the maintenance of infrastructure (tracks, etc.) or for remedial/enhancement works associated with the CNBC habitat.	Compliant; materials brought in are associated with the rehabilitation and management of the site, such as tubestock plantings.
MONITORING	The installation of star pickets and associated monitoring plot infrastructure such as pegs, and tape is permitted. Transect markers and monitoring plots/quadrat markers may be installed as part of the monitoring program.	NA; hard infrastructure for monitoring has not been installed because it has not been considered necessary by the suitably qualified ecologists conducting the site monitoring required by the Approval.

C.4 Management Issues and Actions

The assessments at the 3-year period, identified several management issues which need to be tackled to ensure the ongoing viability of the Offset Site for CNBC. Information is provided below for each of the 4 matters identified from the audit that need remedial works undertaken, or the task to be completed, which are further summarised in **Table 9.**

Culvert input from Last Street West

The culvert which directs overflow water from the adjacent roadside drain into the Offset Site needs to be remodified to be functional.

When the Offset Site was developed, a small clay bund wall was installed in the roadside drain (Last Street West) to direct some surface flows into the culvert that fed water to the drainage system of the Offset Site; see images below.

The bunding needs to be reinstated with its height being 3 cm above the base of the culvert so that water would flow into the culvert and then to the Offset Site. The bunding needs to be permanent and made of a non-erodible product. When in peak or high flow the roadside drain would not be blocked by this bund, and therefore not all water would go into the Offset Site from the roadside drain.





Image above – Drain inside the Offset Site which receives water from the drain in last Street West

Image left – Drain in Last Street West which requires the reinstatement of a bund to direct some flows into the River Road Offset Site

Weed occurrences

Three-cornered garlic has been a sporadic weed at the Offset Site before and since its establishment as an Offset Site. Daffodils are also present but have been less abundant. Most three-cornered garlic plants were sprayed when the site was established in December 20212, but some have recovered, and new plants (from seed) have emerged. The images below show patches of the weed in the Offset Site. While three-cornered garlic doesn't grow in the very wet areas, and those areas that are inundated for longer periods, it does pose a risk of further invading the drier areas and mounds in the site.

Also present is wild mignonette (*Reseda luteola*) and great mullein (*Verbascum thapsus*) which should be sprayed to prevent further seed set and spread. The lack of broad soil disturbance at the site, and the expanding area covered by sedges, rushes, and grasses is reducing the coverage of weeds including spear thistle (*Cirsium vulgare*) which should become very uncommon over time.



Loss of plantings

There has been the loss of several plantings throughout the site, mainly of *Poa labillardierei* (silver tussock grass) planted on the central mounds created from the excavation of the basins to increase the longevity of water lie by shading and to establish a source of organic input (leaf drop). The value of the *Poa* tussocks to the CNBC is evident from the use of them to support chimneys, and the shade/cover they create from predation and desiccation. The losses are likely due to periods of dry and/or herbivory by the wallabies that frequent the site from the nearby forested vegetation of Dooleys Hill.

Many of the *Eucalyptus ovata* plantings have also been grazed to the point of death by wallabies but 12 mature individuals survive from the original planting and are now well established. The number of survived *E. ovata* trees meets the requirement to replace/offset the loss of *E. ovata* caused by the Project.

The southern and eastern sides of the Offset Site are devoid of trees/shrubs despite several having been planted there – herbivory and grass competition have likely conspired to cause the death of the planted tubestock. Additional mature (trees that have their foliage mostly above wallaby herbivory height) trees of both blackwood (*Acacia melanoxylon*) and swamp paperbark (*Melaleuca ericifolia*) should be planted in winter 2026 in copses to create areas of shade over the waterbodies and an organic input in the form of fallen leaf litter and bark. The recommended number of trees of each species is provided in **Table 9.**

Table 9. Management issues and recommended actions for the River Road Offset Site

Management Issue	Action	Timing for completion
Reinstatement of bund at culvert on Last Street West	Reinstate a small bund at the black culvert in Last Street West (50% of the height of the culvert) to direct flows into the Offset Site – bund could be instant concrete bags installed	Early-November 2025
Spread of three-cornered garlic and daffodils **Occurrences of wild mignonette and great mullein**	Weed spraying	Early-November 2025
Loss of some plantings, especially *Poa* tussocks	Additional plantings of *Poa labillardierei* (500 plugs) Additional mature blackwood trees (8) Additional mature swamp paperbark trees (15)	Winter 2026

PART D – INDIRECT IMPACT SITE MONITORING

D.1 Scope

As part of the Approval, Conditions 9c and 10 are relevant to the monitoring of the potential indirect impacts to CNBC. A report was prepared to set the baseline conditions (see VDC 2022; **Attachment 4**).

Figure E-1 shows the location of the photopoint monitoring locations.

D.2 Possible Indirect Impacts

It was unlikely that there would be any undesirable or unanticipated impacts (during construction and post-construction) to areas downstream of the work sites for the Project. Risks such as sediment release into the water column were managed by the application of standard construction site sediment/erosion control measures. The management of risks, especially sediment release, were managed via *EPG 1: Disturbance to Terrestrial and Aquatic Flora and Fauna* and *EPG 2: Erosion, Sedimentation and Surface Run-off*. Notwithstanding the implementation of controls, there was the small risk that some indirect impacts may occur downstream of where the works are to occur, and the impacts may affect CNBC burrows or CNBC habitat.

D.3 Locations of potential indirect impacts

The following notes are provided for each of the three **indirect impact** areas to be monitored.

Sammy's Creek

The full extent of Sammy's Creek from the impact area through to the Mersey River is suitable habitat for CNBC. Burrows were observed in a few sections of the creek system, but an exhaustive survey was not undertaken by VDC because it is outside the direct impact area. The increased water flow and/or frequency of peak flow into the new culvert are unlikely to cause any impact to the habitat present however the monitoring of habitat quality and burrows in selected locations along the creek should be conducted to demonstrate that no net impact has occurred.

River Road into Bells Parade

The drain from River Road flows north-westwards into Bells Parade where it terminates in a culvert/pipe which drains to the Mersey River. Burrows are prolific in the drain, especially on a steep embankment adjacent to the *Melaleuca ericifolia* swamp forest remnant and near the terminal culvert/pipe of the drain. The water flow and/or frequency of peak flow into the upgraded culvert system is unlikely to change so the works are unlikely to cause any significant indirect impact to the habitat present. Monitoring of habitat quality and burrows in the drain will be conducted to demonstrate that no net impact has occurred.

Kings Creek

The full extent of Kings Creek from the impact area through to the Mersey River is suitable habitat for CNBC. Burrows were observed in a few sections of the creek system, with a survey of the creek system having been done by Entura. Kings Creek is a highly modified creek system from Kings Park downstream to the Mersey River. Some sections are piped as they occur under streets and car parks associated with the Latrobe

township. Where it is not piped or bounded by hard infrastructure (i.e., retaining walls) it is dominated by weeds and pasture grasses and herbs with occasional remnant native trees such as blackwood (*Acacia melanoxylon*) and silver wattle (*A. dealbata*). Introduced deciduous trees and 'garden escape' woody and non-woody weeds are locally dominant.

D.4 Results

Sixteen photopoints (**Figure E-1**) were established to facilitate the visual monitoring of habitat conditions and surrounds prior to the commencement or works. Location details are provided in **Attachment 4.**

The focus for monitoring was on River Road and associated streets, including Bells Parade (**Figure E-2**), given the pre-development existence of many *Engaeus* in those locations compared to other locations such as Sammys Creek and Kings Creek through the actual Latrobe township.

Plate 7 shows examples of the pre-development, 52 week and 3-year images of photopoints monitored.

Table 10 provides a summary of the results of surveys done at 52 weeks and 3 years after the establishment of the River Road and Kings Park Offset Sites.

D.5 Summary

The observations and checks made at each of the photopoints for the required time periods indicates that where *Engaeus* have been recorded in the past (pre-development) there are, except[t for one site, Engaeus burrows still present. The exception is at Sammys Creek (Site 14 in **Figure E-1**) where a single burrow was recorded in the pre-development surveys adjacent to an old drainage pipe – it was dry and appeared to have not been occupied for a long time, possibly years. No burrows were detected here at any of the follow up checks of that location, despite suitable habitat being present.

The indirect monitoring of potential impacts from the Project to *Engaeus* and its habitat could cease as the impacts are nil or negligible; we do not consider the habitat to be degraded within the meaning of the Approval. To the contrary, the habitat monitored is either unchanged or better for *Engaeus*.

450000

5435000

0 125 250 500 Meters

N

Photopoints
Monitoring Areas
Offset Areas
Habitat Loss Area

MERSEY RIVER

PIG ISLAND

S10
S9
S8
S7
S6
S1
S2
S3
S4
S5

Bells Parade Monitoring Area (See Fig E2)

River Road Offset Site

MERSEY RIVER

MILES FORD BRIDGE

LATROBE TOWNSHIP

KINGS PARK

KINGS CREEK

Kings Park Offset Site

S15
S16
S13
S12
S11
S14

GILBERT STREET

KINGS CREEK

Kings Creek Potential Monitoring Area

Sammys Creek Potential Monitoring Area

SAMMYS CREEK (DRAIN)

MERSEY RIVER

MINOR TRIBUTARY

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LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure E1: Indirect impact monitoring areas for CNBC burrows and habitat

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

449800 449900 450000 450100 450200

5435600 5435500 5435400 5435300

0 50 100 200 Meters

Observed Engaeus Burrows Sept 2025

Monitoring Areas (Drains)

N

MERSEY RIVER

PIG ISLAND

BELLS PARADE

RIVER ROAD

BELLS PARADE OFFSET AREA

MERSEY RIVER

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LATROBE LEVEE PROJECT

EPBC COMPLIANCE MONITORING REPORT

Figure E2: Indirect impact monitoring areas at Bells Parade - Sept 2025

TASMAP:	LGA:
LATROBE	LATROBE

Base data by TASMAP. © State of Tasmania
Base image by TASMAP. © State of Tasmania

Van Diemen CONSULTING



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A3 - NA

CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL

DATE: 15 OCT 2025

Plate 7. Photopoint images of selected indirect impact sites at 52 weeks, and 3 years after works

SITE S8 - PREDEVELOPMENT	52 WEEKS	3 YEARS
		
SITE S7 - PREDEVELOPMENT	**52 WEEKS**	**3 YEARS**
		

SITE S1 - PREDEVELOPMENT	52 WEEKS	3 YEARS







SITE S10 - PREDEVELOPMENT	52 WEEKS	3 YEARS









Yellow circle highlights the abundance of *Engaeus* burrows

SITE S2 - PREDEVELOPMENT	52 WEEKS	3 YEARS







SITE S6 - PREDEVELOPMENT	52 WEEKS	3 YEARS







Table 10. Assessment of *Engaeus* occurrence and approximate numbers of burrows in each area assessed

Site Number	Views Photographed	Comments	Pre-development	2 years	3 years
1	Westwards	Open drain Last Street West with River Road in distance. Adjacent to River Road Offset Site.	Yes, in roadside and in-park drains – CNBC location and numbers recorded during the approval process	>50 burrows	>50 burrows
2	Eastwards looking along Last Street West	Open drain at junction of River Road and Last Street West. Adjacent to River Road Offset Site.		>50 burrows	>60 burrows
	Northwards looking along River Road	Open drain at junction of River Road and Last Street West. Adjacent to River Road Offset Site.		>30 burrows	>40 burrows
3	Southwards along River Road	Open drain at junction of River Road and Last Street West.		>30 burrows	>30 burrows
4	Northwards along River Road	Open drain on River Road looking towards junction of River Road and Last Street West.		17 burrows	23 burrows
5	Eastwards on Last Street West	Open drain Last Street West. Partly adjacent to River Road Offset Site.		>50 burrows	>50 burrows
6	Northwards along River Road	Open drain adjacent to River Road, with the River Road Offset Site adjacent to the east.		8 burrows	14 burrows
	Southwards along River Road			4 burrows	7 burrows
7	Westwards towards culvert	Open drain into culvert and pipe under River Road.		3 burrows	2 burrows
	Southwards	Open drain adjacent to River Road, adjacent (eastwards) to River Road Offset Site.		9 burrows	16 burrows
8	Eastwards	On footbridge over drain that leads away from River Road. Looking eastwards to River Road		5 burrows	11 burrows

	Westwards	On footbridge over drain that leads away from River Road. Looking westwards to Bells Parade.		1 burrow	4 burrows
9	Eastwards	Open drain adjacent to retained native forest that directs water from River Road to the stormwater culvert at Site Number 10.		1 burrow	1 burrow
	Westwards				
10	Eastwards	Large terminal culvert leading to stormwater discharge at the Mersey River.		>40 burrows	>40 burrows
11	Eastwards (upstream Sammys Creek)	Open drain with *Typha latifolia* infestations bordered by blackwood plantings.	None recorded.	None recorded.	None recorded.
	Westwards (downstream Sammys Creek)				
12	Eastwards (upstream Kings Creek)	Looking towards the creek embankment adjacent to Victor Street (bridge). Area dominated by blue periwinkle (*Vinca major*).	Yes, in Kings Creek banks under weed infestations – CNBC location and numbers recorded during the approval process	1 burrow	4 burrows
	Westwards (downstream Kings Creek)	Looking towards the creek embankment from Victor Street below local businesses that are accessed from Gilbert Street. Area dominated by blue periwinkle (*Vinca major*).			
13	Eastwards (upstream Kings Creek)	Open drain section of Kings Creek that crosses under Victor Street. Highly modified creek bed and banks with rock and concrete walls and hotel infrastructure crossing the creekline.	None recorded. Previous Entura record (1 burrow) upstream.		
14	Eastwards (upstream Sammys Creek)	Looking towards the culvert that will be decommissioned, and the private bridge to be upgraded and lifted.	One burrow observed at the culvert entrance to Sammys Creel (within the impact area – burrow and habitat already offset)	None recorded.	None recorded.
	Westwards (downstream Sammys Creek)	Open drain with *Typha latifolia* infestations bordered by blackwood plantings.	None recorded.		

15	Eastwards (upstream Kings Creek)	Located on the eastern side of the footbridge that crosses Kings Creek in Sheehan Park. Retaining wall structure present for full length of creekline to Kings Park (can be seen in background).	None recorded. Retaining wall probably precludes habitation by CNBC.	None recorded.	None recorded.
	Westwards (downstream Kings Creek)	Located on the western side of the footbridge that crosses Kings Creek in Sheehan Park. Rock footings of previous bridges can be seen in the photo.	Grassy creek bank with burrows previously recorded by Entura.		
16	Eastwards (upstream Kings Creek)	Located on the northern side of the bridge that crosses Gilbert Street. Photo taken at the rail edge looking towards a planted pine tree.	None recorded.	None recorded.	None recorded.

PART E – DISCUSSION AND CONCLUSION

E.1 Offset Site establishment and *Engaeus* Translocation

Two Offset Sites were established to offset the residual direct and indirect impact to *Engaeus granulatus* (central north burrowing crayfish, CNBC); a species listed as endangered on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Details of their establishment are provided in **Attachment 3.**

Very few animals were salvaged and translocated – 2 *Engaeus* were introduced to each Offset Site. One burrow showed continuous activity of the burrow which shows animal persistence throughout the 3 years of monitoring; however, it may not have been the same animal).

E.2 Colonisation of Offset Sites by *Engaeus* and indirect impacts

Kings Park Offset Site

Engaeus have increased in number and distribution at the Kings Park Offset Site since its establishment. The occurrence of *Engaeus* at this site has varied over the course of the Project, possibly due to the marginality and seasonality (annual fluctuations ion water runoff from surrounding areas with a limited catchment) of the water inputs to the site. The habitat created in the OS is functionally suitable for *Engaeus*, but some remediation works are required.

The habitat downstream of the Kings Park site remains functionally comparable to the pre-development state.

River Road Offset Site

It took 3 years for the River Road Offset Site to become colonised within its 'core' by 6 *Engaeus*, and at least 2 others within the more peripheral areas of the OS (**Figure D5**). *Engaeus* may have colonised between the 2- and 3-year monitoring event, or prior to that, but their presence may have gone undetected due to the prolific and dense growth of vegetation (e.g. rushes, sedges, grasses).

Many burrows remain active in the surrounding roadside drains and downstream drains (monitoring locations S4 to S10 in **Figure E1**) of the River Road area (**Figures D5 and E2**) – the development and its functional use have not affected the habitat of *Engaeus* beyond the directly impacted areas quantified by the OMMP and offset by the establishment of the Offset Sites (**Figure A5**).

E.3 Remedial works at Offset Sites

Kings Park Offset Site

Remedial works identified from the 3-year assessment that need to be implemented are provided below -

Management Issue	Action	Timing for completion
Leak in second basin	Fix leak using clay or similar	Mid-November 2025

Spread of three-cornered garlic	Weed spraying	Early-November 2025
Loss of some plantings, especially *Poa* tussocks	Additional plantings of *Poa labillardierei*	Winter 2026
Signage	Add signage	Late November 2025

River Road Offset Site

Remedial works identified from the 3-year assessment that need to be implemented are provided below -

Management Issue	Action	Timing for completion
Reinstatement of bund at culvert on Last Street West	Reinstate a small bund at the black culvert in Last Street West (50% of the height of the culvert) to direct flows into the Offset Site – bund could be instant concrete bags installed	Early-November 2025
Spread of three-cornered garlic and daffodils **Occurrences of wild mignonette and great mullein**	Weed spraying	Early-November 2025
Loss of some plantings, especially *Poa* tussocks	Additional plantings of *Poa labillardierei* (500 plugs) Additional mature blackwood trees (8) Additional mature swamp paperbark trees (15)	Winter 2026

E.4 Rehabilitation of pre-development known and potential *Engaeus* habitat

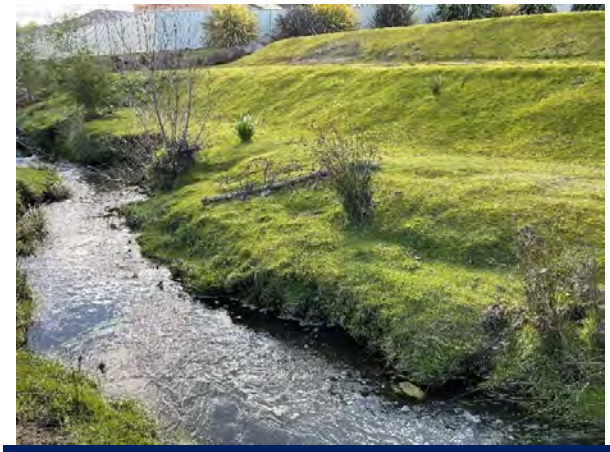
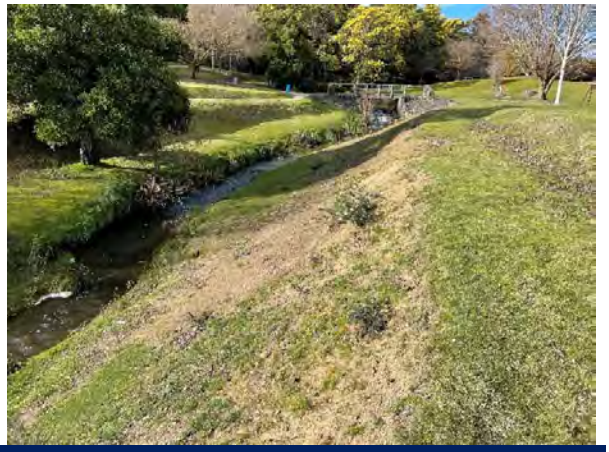
Kings Park Offset Site

The area impacted by the Project at Kings Park was marginal, with very few *Engaeus* present. Notwithstanding that, the area of habitat was offset through the establishment of the Offset Site in the eastern section of Kinghs Park. In the 3 years since the Offset Site was established, and with the completion of earthworks for the Project, the area of impact has become stable, and . Plate 8 provided images of the area before development occurred, and at 3 years after the establishment of the Offset Site. It is possible that *Engaeus* will colonise the area impacted given time, which would provide a net positive impact to the species given the habitat impacted at Kings Park has rehabilitated, **and** new habitat created which exceeds the total area of impact originally caused/predicted to be caused.

Plate 8. Images of the Kings Park Impact Area pre-development and at 3 years post-development

Pre-development



3 years








River Road Offset Site

The impact to potential habitat at the River Road site could not be rehabilitated post-development because it became levee walls and roadways. Notwithstanding that, the area around the installed drainage pipe and culvert system to replace the pre-existing has become colonised by *Engaeus* burrows, and this is likely to continue given time.

E.5 New area now occupied by *Engaeus*

A new area has become occupied by *Engaeus* since the works were completed; the eastern side of the swamp paperbark remnant on River Road. The retaining wall built on River Road (see **Plate 9**), contains as part of the structure a centralised location of water input from the road surface. Pre-development, water had sheeted across the road and drained all along the western side of River Road, without any concentration of the water. The sheeted water from the road surface was directed to a grass verge where it dissipated into the ground rather than accumulating in a drain or other stormwater system. The installation of the retaining wall, and the associated drainage pipe and road guttering, has likely created regular flows of surface water to support the establishment of *Engaeus*. Burrows also occurred further into the adjacent swamp forest vegetation.

Plate 9. New habitat area associated with retaining wall concentrated drainage





PART F – REFERENCES

Latrobe Council (2022). Latrobe Levee Project (EPBC 2020/8846) Offset Management and Monitoring Plan, Central North burrowing crayfish. Prepared by the Latrobe Council with assistance from Van Diemen Consulting Pty Ltd.

Van Diemen Consulting Pty Ltd (2021). Ecological and Natural Values Assessment – Latrobe Levee Project. October 2021. Prepared for Latrobe Council.

Van Diemen Consulting Pty Ltd (2022). Latrobe Levee Project – Indirect Impact Monitoring. August 2022. Prepared for Latrobe Council.

Van Diemen Consulting Pty Ltd (2023). Latrobe Levee Project – EPBC 2020/8846, Central North burrowing crayfish salvage and translocation reporting. Prepared for Latrobe Council.

Part G - ATTACHMENTS

Attachment 1. EPBC 2020/8846 – Approval documentation and conditions

Australian Government
Department of Agriculture, Water and the Environment

APPROVAL

Latrobe Levee, Latrobe, Tasmania (EPBC 2020/8846)

This decision is made under sections 130(1) and 133(1) of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (the EPBC Act). Note that section 134(1A) of the EPBC Act applies to this approval, which provides in general terms that if the approval holder authorises another person to undertake any part of the action, the approval holder must take all reasonable steps to ensure that the other person is informed of any conditions attached to this approval, and that the other person complies with any such condition.

Details

Person to whom the approval is granted (approval holder)	Latrobe Council
ABN of approval holder	95 331 358 491
Action	To construct a series of levees and associated infrastructure within and around the Latrobe township, in Latrobe, central-north Tasmania. [See referral EPBC 2020/8846 and the variation of the action accepted by the Minister under section 156B on 16 November 2021.]

Proposed Approval decision

My decision on whether or not to approve the taking of the action for the purposes of the controlling provision for the action is as follows.

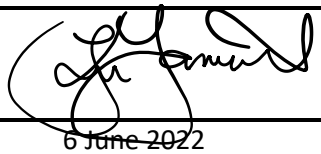
Controlling Provisions

Listed Threatened Species and Communities	
Section 18	Approve
Section 18A	Approve

Period for which the approval has effect

This approval has effect until 1 June 2042

Decision-maker

Name and position	Kim Farrant Assistant Secretary Environment Assessments (Vic, Tas) and Post Approvals Branch
Signature	
Date of decision	6 June 2022

Conditions of approval

This approval is subject to the conditions under the EPBC Act as set out in ANNEXURE A.

ANNEXURE A – CONDITIONS OF APPROVAL

Part A – Conditions specific to the action

1. The approval holder must not **clear** more than 0.064 hectares of **Central North Burrowing Crayfish habitat** within the **project area**.

2. The approval holder must not **clear** or **construct** outside of the **project area.**

3. The approval holder must carry out **habitat creation and enhancement** within the **offset areas**.

4. The approval holder must place the **offset areas** on the **Latrobe Council's asset register** as a bushland reserve prior to commencement of the action, and must maintain their status on the register for the duration of the approval.

5. The approval holder must ensure that the **offset areas** are zoned as either 'Open Space Zone' or 'Environmental Management Zone' as described in the ***Latrobe Interim Planning Scheme 2013*** for the duration of the approval.

6. To minimise impacts to the **Central North Burrowing Crayfish**, the approval holder must engage a **suitably qualified ecologist** to **salvage** and **translocate** all **Central North Burrowing Crayfish** present in the **project area** within three months prior to the **commencement of the action**.

7. Within 6 weeks following **salvage** and **translocation** of the **Central North Burrowing Crayfish,** the approval holder must provide a report to the **department** that specifies the number of **Central North Burrowing Crayfish** that have been identified by a **suitably qualified ecologist** as:

    a. successfully **salvaged**,

    b. successfully **translocated**,

    c. euthanised during **salvage** and **translocation**, and

    d. died during **salvage** and **translocation**.

8. The approval holder must implement the **OMMP.**

9. To adequately monitor the success of the **OMMP,** the approval holder must engage a **suitably qualified ecologist** to:

    a. Conduct **burrow counts** and **photopoint monitoring** of the **translocation areas** within 24 hours after the completion of **salvage** and **translocation**, and at 2, 6, 12, and 26 weeks after the completion of **translocation.**

    b. Conduct **burrow counts** and **photopoint monitoring** of the **offset areas** at 6, 12, 36, 52 weeks after the completion of **salvage** and **translocation**, and then once every 12 months until five years after the **completion criteria** are met.

    c. Conduct **burrow counts** and **photopoint monitoring** at burrows and **Central North Burrowing Crayfish habitat** within the **indirect impact monitoring areas** one week prior to the **commencement of the action**, at 1, 36 and 52 weeks after the completion of **construction**, and then once every 12 months for 3 years**.**

10. If **Central North Burrowing Crayfish** burrows or **Central North Burrowing Crayfish habitat** within the **indirect impact monitoring areas** are found to be **degraded**, the approval holder must, within two months of such detection, submit to the **department** for the **Minister**'s approval, a revised version of the **OMMP** describing the extent and cause of the **degradation** and proposed contigency actions (if necessary) to ensure that within 2 years, the **Central North Burrowing Crayfish burrow counts** and **Central North Burrowing Crayfish habitat** return to their condition prior to **commencement of the action**.

    i. If within two months of submission of the revised **OMMP** to the **department,** the revised version of the **OMMP** is found to be inadequate by the **Minister**, the **Minister** may appprove a version of the **OMMP** revised by the **department.** The approval holder must then implement the approved **OMMP** for the remainder of the life of this approval.

11. The approval holder must meet the **completion criteria** within 10 years from the **commencement of the action.** If the **completion criteria** are not met within this time, within 3 months, the approval holder must submit to the **department** for approval, a revised **OMMP** that incorporates proposed **adaptive management measures** that will ensure that **completion criteria** are met.

    i. If within two months of submission of the revised **OMMP** to the **department,** the revised version of the **OMMP** is found to be inadequate by the **Minister**, the **Minister** may appprove a version of the **OMMP** revised by the **department.** The approval holder must then implement the approved revised **OMMP** for the remainder of the life of this approval and the **completion criteria** must be met at least 12 months prior to the expiry date of this approval.

Part B – Standard administrative conditions

Notification of date of commencement of the action

12. The approval holder must notify the **department** in writing of the date of **commencement of the action** within 10 **business days** after the date of **commencement of the action.**

13. If the **commencement of the action** does not occur within 5 years from the date of this approval, then the approval holder must not **commence the action** without the prior written agreement of the **Minister**.

Compliance records

14. The approval holder must maintain accurate and complete **compliance records**.

15. If the **department** makes a request in writing, the approval holder must provide electronic copies of **compliance records** to the **department** within the timeframe specified in the request.

Note: **Compliance records** may be subject to audit by the **department** or an independent auditor in accordance with section 458 of the **EPBC Act**, and or used to verify compliance with the conditions. Summaries of the result of an audit may be published on the **department**'s **website** or through the general media.

Submission and publication of plans

16. The approval holder must:

    a. submit **plans** electronically to the **department**

b. unless otherwise agreed to in writing by the **Minister**, publish each **plan** on the **website** within 20 **business days** of the date:

   i. of this approval decision or

   ii. the **plan** is approved by the **Minister**,

c. exclude or redact **sensitive ecological data** from **plans** published on the **website** or provided to a member of the public

d. keep **plans** published on the **website** until the end date of this approval.

Annual compliance reporting

17. The approval holder must prepare a **compliance report** for each 12 month period following the date of **commencement of the action**, or otherwise in accordance with an annual date that has been agreed to in writing by the **Minister**. The approval holder must:

    a. include in **compliance reports** the results of **monitoring data** collated by a **suitably qualified ecologist** from **burrow counts** and **photopoint monitoring** conducted at the **translocation area, offset areas**, and **indirect impact areas,** as required under Condition 8a, 8b and 8c respectively, and any other **monitoring data** recorded during the implementation of the **OMMP.**

    b. ensure that any **monitoring data** (including **sensitive ecological data**), surveys, maps, and other spatial and metadata required under any **plans**, is prepared in accordance with the **department's** *Guidelines for biological survey and mapped data* (2018).

    c. publish each **compliance report** on the **website** within 60 **business days** following the relevant 12 month period

    d. notify the **department** by email that a **compliance report** has been published on the **website** and provide the weblink for the **compliance report** within 5 **business days** of the date of publication

    e. keep all **compliance reports** publicly available on the **website** until this approval expires

    f. exclude or redact **sensitive ecological data** from **compliance reports** published on the **website**

    g. where any **sensitive ecological data** has been excluded from the version published, submit the full **compliance report** to the **department** within 5 **business days** of publication.

Note: **Compliance reports** may be published on the **department**'s website.

Reporting non-compliance

18. If the approval holder is made aware of an **incident,** they must cease the action immediately. The approval holder must not recommence the action unless authorised in writing by the **Minister**.

19. The approval holder must notify the **department** in writing of any: **incident**; non-compliance with the conditions; or non-compliance with the commitments made in **plans**. The notification must be given as soon as practicable, and no later than 2 **business days** after becoming aware of the **incident** or non-compliance. The notification must specify:

a. any condition which is or may be in breach

b. a short description of the **incident** and/or non-compliance

c. the location (including co-ordinates), date, and time of the **incident** and/or non-compliance. In the event the exact information cannot be provided, provide the best information available.

20. The approval holder must provide to the **department** the details of any **incident** or non-compliance with the conditions or commitments made in **plans** as soon as practicable and no later than 10 **business days** after becoming aware of the **incident** or non-compliance, specifying:

    a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future

    b. the potential impacts of the **incident** or non-compliance

    c. the method and timing of any remedial action that will be undertaken by the approval holder.

Independent audit

21. The approval holder must ensure that **independent audits** of compliance with the conditions are conducted as requested in writing by the **Minister**.

22. For each **independent audit**, the approval holder must:

    a. provide the name and qualifications of the independent auditor and the draft audit criteria to the **department**

    b. only commence the **independent audit** once the audit criteria have been approved in writing by the **department**

    c. submit an audit report to the **department** within the timeframe specified in the approved audit criteria.

23. The approval holder must publish the audit report on the **website** within 10 **business days** of receiving the **department's** approval of the audit report and keep the audit report published on the **website** until the end date of this approval.

Completion of the action

24. Within 30 days after the **completion of the action**, the approval holder must notify the **department** in writing and provide **completion data**.

Part C - Definitions

In these conditions, except where contrary intention is expressed, the following definitions are used:

Adaptive management measures mean the range of actions that will systematically be taken to continually improve the protection of **Central North Burrowing Crayfish** individuals, burrows, and habitat, by learning from the outcomes of current practises. **Adaptive management measures** may consist of, but are not limited to, increased drainage works, additional plantings, or additional offsets.

Burrow count means an accurate numerical quantification of the number of **Central North Burrowing Crayfish** burrows within a defined area.

Business day means a day that is not a Saturday, a Sunday or a public holiday in the state or territory of the action.

Central North Burrowing Crayfish means the **EPBC Act** listed threatened species *Engaeus granulatus.*

Central North Burrowing Crayfish habitat means areas that support individuals or populations of Central North Burrowing Crayfish.

Clear or **Clearing** means the cutting down, felling, thinning, logging, removing, killing, destroying, poisoning, ringbarking, uprooting or burning of vegetation (but not including weeds – see the *Australian weeds strategy 2017 to 2027* for further guidance).

Commence the action or **Commencement of the action** means the first instance of any specified activity associated with the action including **clearing** and **construction**. **Commencement of the action** does not include minor physical disturbance necessary to:

i. undertake pre-clearance surveys or monitoring programs

ii. install signage and /or temporary fencing to prevent unapproved use of the **project area**

iii. protect environmental and property assets from fire, weeds and pests, including installation of temporary fencing, and maintenance of existing surface access tracks

iv. install temporary site facilities for persons undertaking pre-commencement activities so long as these are located where they have no impact on the **protected matters**

Completion criteria means the following indicators used to determine whether the **OMMP** has been successful in meeting its objectives: less than 5% of projected foliage coverage of Declared Weeds or Weeds of National Significance present in or adjacent to the habitat created for the **Central North Burrowing Crayfish**¸ at least 2, 050 m^2 of **Central North Burrowing Crayfish habitat** created within the **offset areas**, no moderately or highly erosive surfaces present in habitat created within the **offset areas**, and a species stocking rate of **Central North Burrowing Crayfish** within the **offset areas** of at least 5/6 calculated using the methodology described in Table 18 of the **preliminary documentation**.

Completion data means an environmental report and spatial data clearly detailing how the conditions of this approval have been met. The **department**'s preferred spatial data format is **shapefile**.

Completion of the action means the date on which all specified activities associated with the action have permanently ceased.

Compliance records means all documentation or other material in whatever form required to demonstrate compliance with the conditions of approval in the approval holder's possession or that are within the approval holder's power to obtain lawfully.

Compliance report means a written report that:

i. provides accurate and complete details of compliance, **incidents**, and non-compliance with the conditions and the **plans**

ii. is consistent with the **department's** *Annual Compliance Report Guidelines* (2014)

iii. includes a **shapefile** of any clearance of any **protected matters**, or their habitat, undertaken within the relevant 12 month period

iv. annexes a schedule of all **plans** prepared and in existence in relation to the conditions during the relevant 12 month period.

Construct or **Construction** means the erection of a building or structure that is or is to be fixed to the ground and wholly or partially fabricated on-site, any work which involves breaking of the ground and the mechanical movement of soil, subsoil and/or rock, including preliminary site preparation, the laying of prefabricated materials in and/or on the ground, and any associated excavation work. **Construction** does not include the installation of temporary fences and signage.

Degraded or **Degradation** means a decrease in condition as quantified by the parameters specified in the **OMMP** (burrow count, habitat erosion, wetness, plantings, sedimentation).

Department means the Australian Government agency responsible for administering the **EPBC Act**.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Cth).

Habitat creation and enhancement means the implementation of measures (within the stated timeframes) specified in Table 8 of the **OMMP** for the purpose of establishing or improving **Central North Burrowing Crayfish habitat** within the **offset areas**.

Incident means any event which has the potential to, or does, impact on one or more **protected matter(s)**.

Independent audit: means an audit conducted by an independent and **suitably qualified person** as detailed in the *Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines* (2019).

Indirect impact monitoring areas means the locations represented in Attachment C by blue lines labelled '*potential monitoring area'***.**

Latrobe Council's asset register means the list of the approval holder's physical resources and associated management responsibilities.

Latrobe Interim Planning Scheme 2013 means the current *Latrobe Interim Planning Scheme 2013* or any planning scheme that replaces it.

Monitoring data means the data required to be recorded under the conditions of this approval.

Minister means the Australian Government Minister administering the **EPBC Act** including any delegate thereof.

Offset areas means the two areas represented in Attachment B by the zones enclosed by the green lines labelled 'River Road Offset Site' and 'Kings Park Offset Site'.

OMMP means the *Latrobe Levee Project Offset Management and Monitoring Plan Central North Burrowing Crayfish, Version 5,* and its attachments (listed below), as submitted to the department on 7 April 2022. Attachments: Attachment 1: Environment Protection Guidelines-Latrobe Levee Project, Attachment 2: Operating Procedure-Latrobe Levee Project, Central North Burrowing Crayfish salvage and translocation, Attachment 3: Photopoint Guidelines, Attachment 4: River Road Offset Site Detailed Design, Attachment 5, Kings Park Offset Site Detailed Design, Attachment 6: Indirect Impact Monitoring Procedure-Latrobe Levee Project.

Photopoint monitoring means the practise of consistently taking photos of the surrounding environment from the same perspective at defined locations across time, to observe changes in the physical environment, in accordance with Attachment 3 of the **OMMP**.

Plan(s) means the **OMMP** or any of the documents required to be prepared, approved by the **Minister**, implemented by the approval holder and published on the **website** in accordance with these conditions (includes action management plans and/or strategies).

Preliminary documentation means the assessment documentation for the approval, submitted to the **department** on 16 February 2022.

Project area means the location of the action as shown enclosed by yellow lines in Attachment A.

Protected matter means a matter protected under a controlling provision in Part 3 of the **EPBC Act** for which this approval has effect.

Salvage or **salvaged** means to safely remove **Central North Burrowing Crayfish** from the **project area** in accordance with the **OMMP**.

Sensitive ecological data means data as defined in the Australian Government Department of the Environment (2016) *Sensitive Ecological Data – Access and Management Policy V1.0.*

Shapefile means location and attribute information of the action provided in an Esri shapefile format. Shapefiles must contain '.shp', '.shx', '.dbf' files and a '.prj' file that specifies the projection/geographic coordinate system used. Shapefiles must also include an '.xml' metadata file that describes the shapefile for discovery and identification purposes**.**

Suitably qualified ecologist means a person who has a tertiary qualification in environmental science, ecology or biology from a recognised educational institution and at least three (3) years of work experience designing and implementing surveys for Central North Burrowing Crayfish and planning and implementing relocation of freshwater crustacea and can give an authoritative assessment and advice on the presence of Central North Burrowing Crayfish using relevant protocols, standards, methods and/or literature.

Suitably qualified person means a person who has professional qualifications, training, skills and/or experience related to the nominated subject matter and can give authoritative independent assessment, advice and analysis on performance relative to the subject matter using the relevant protocols, standards, methods and/or literature.

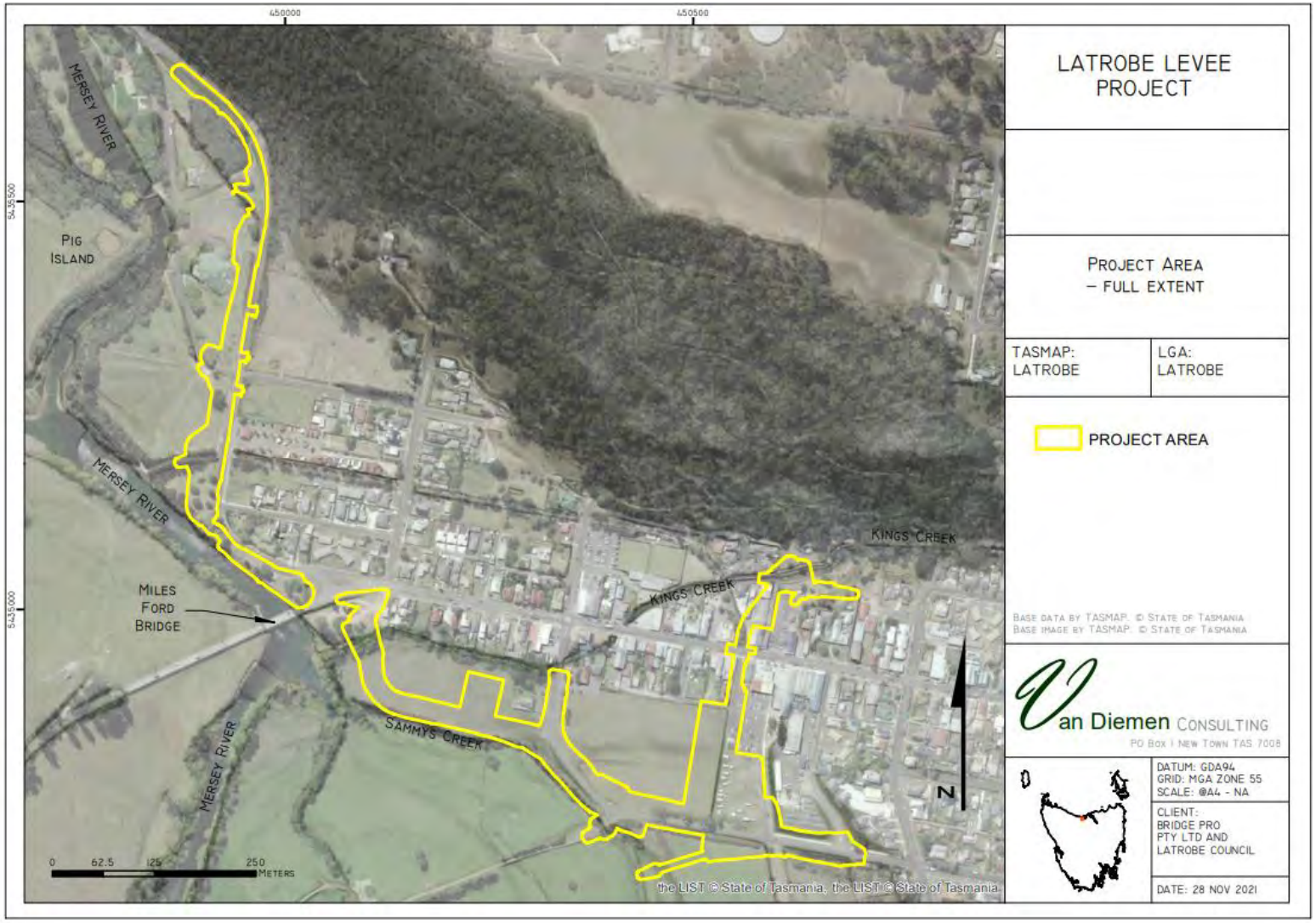
Translocate, **translocated** or **translocation** means the process of moving **salvaged Central North Burrowing Crayfish** to the **translocation areas** within the **offset areas**, in accordance with the **OMMP.**

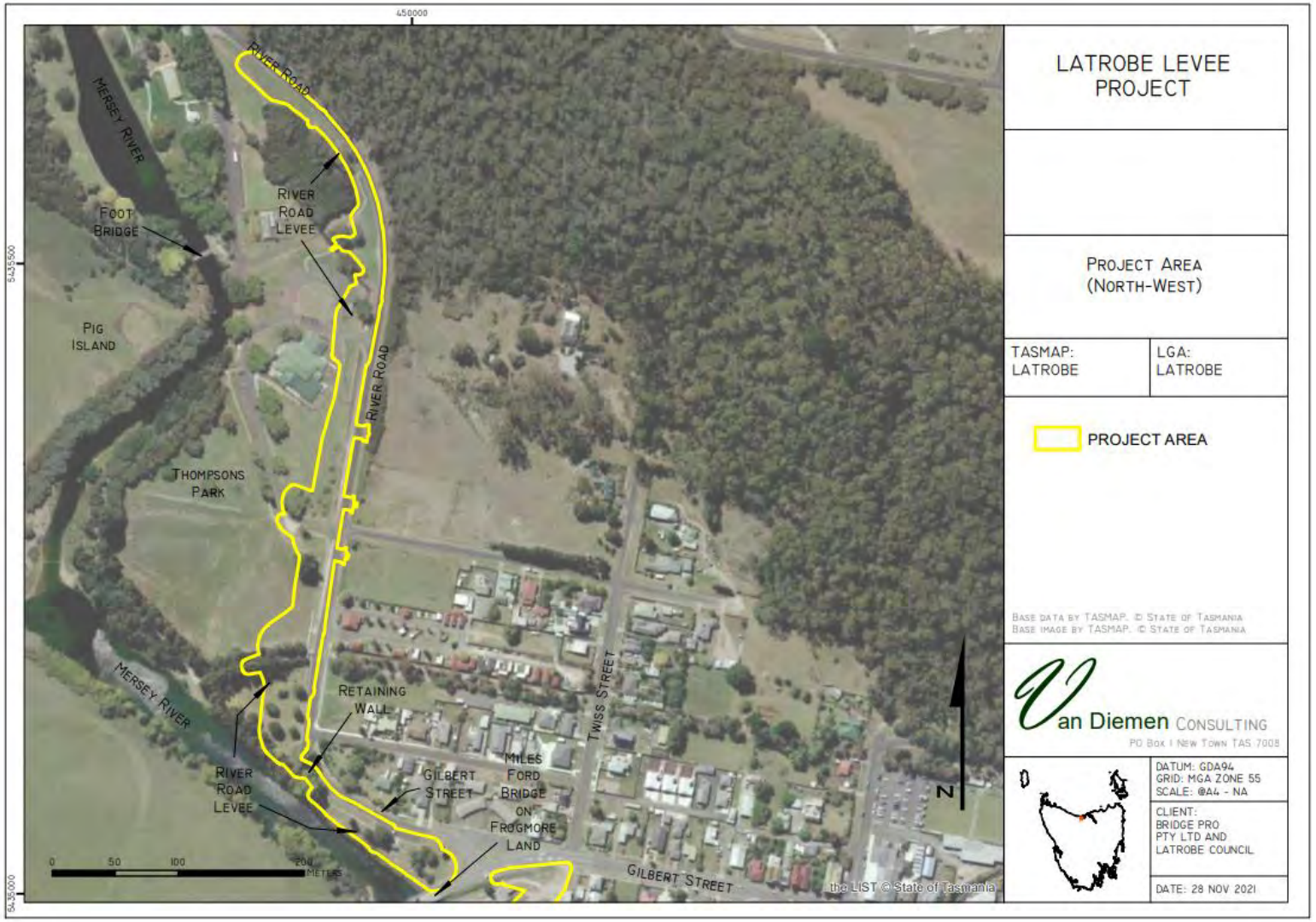
Translocation areas means the areas prepared in accordance with the **OMMP** to provide habitat for **salvaged Central North Burrowing Crayfish** within the two **offset areas**.

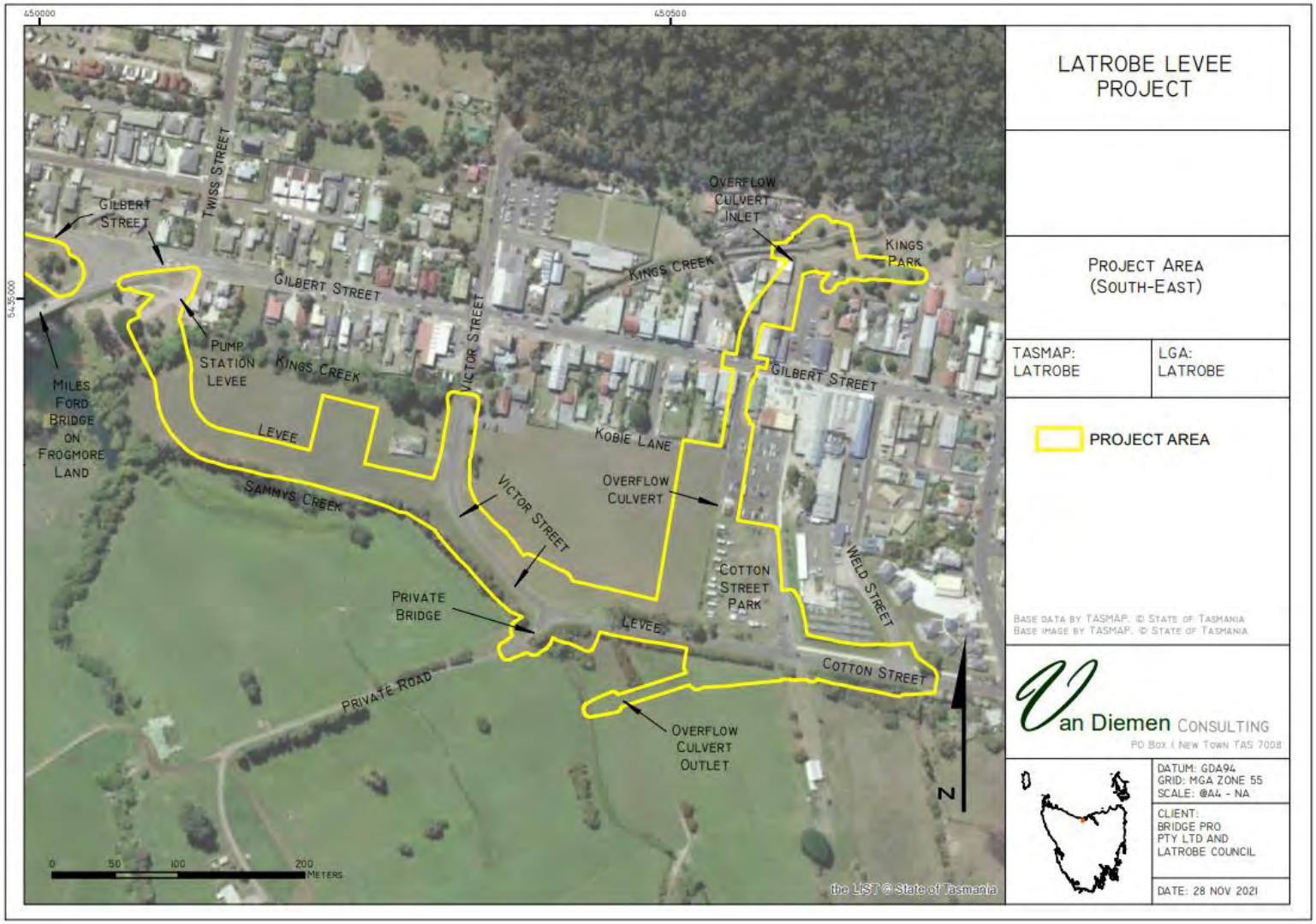
Website means a set of related web pages located under a single domain name attributed to the approval holder and available to the public.

ATTACHMENTS

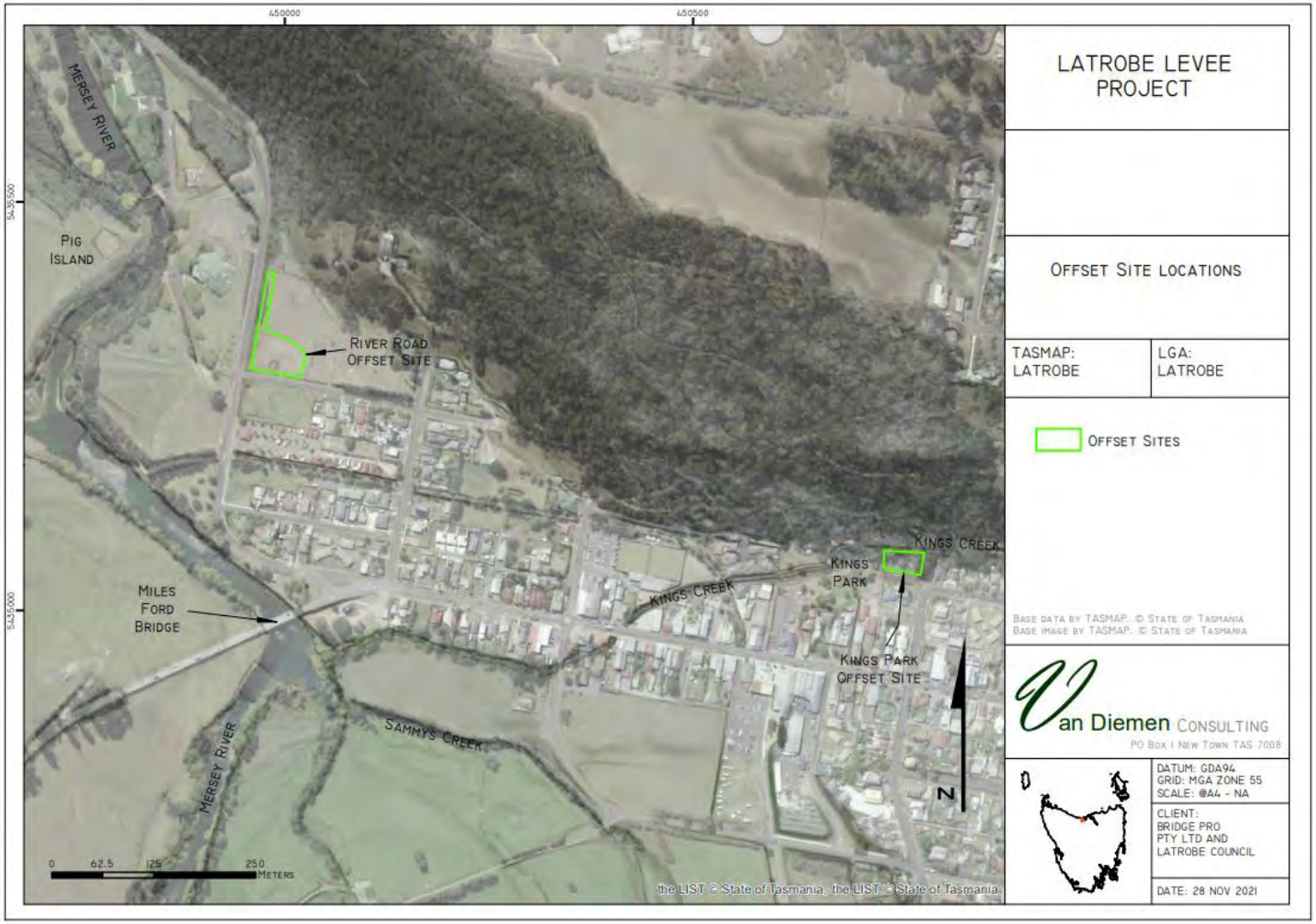
Attachment A: Project Area



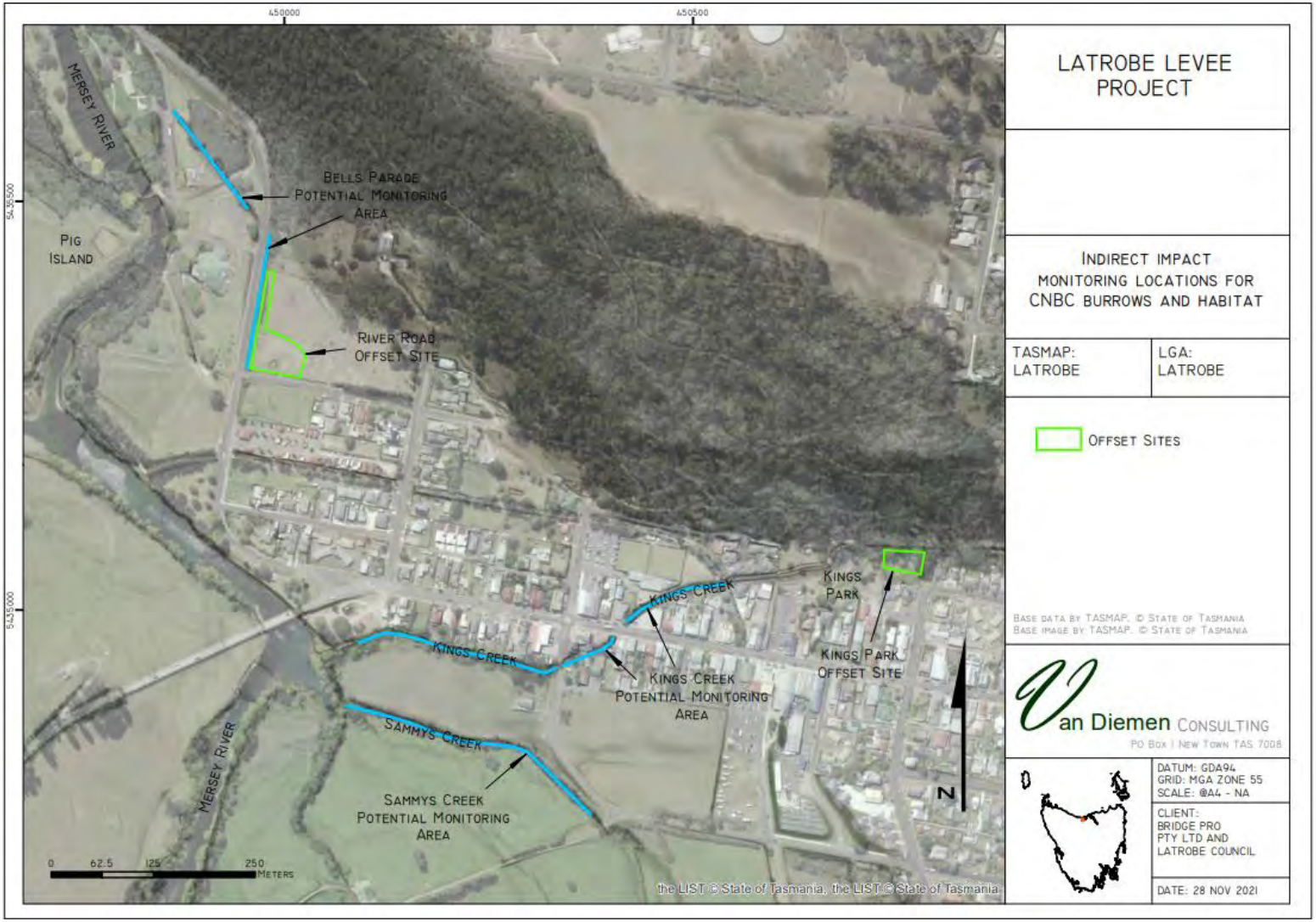

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MERSEY RIVER
RIVER ROAD
FOOT BRIDGE
RIVER ROAD LEVEE
PIG ISLAND
RIVER ROAD
THOMPSONS PARK
MERSEY RIVER
RETAINING WALL
TWISS STREET
RIVER ROAD LEVEE
GILBERT STREET
MILES FORD BRIDGE ON FROGMORE LAND
GILBERT STREET
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0 50 100 200 METERS
the LIST © State of Tasmania
LATROBE LEVEE PROJECT
PROJECT AREA (NORTH-WEST)
TASMAP: LATROBE
LGA: LATROBE
PROJECT AREA
BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA
Van Diemen CONSULTING
PO Box 1 New Town TAS 7008
DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA
CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL
DATE: 28 NOV 2021


450000
450500
5435000
GILBERT STREET
TWISS STREET
GILBERT STREET
PUMP STATION LEVEE
KINGS CREEK
VICTOR STREET
OVERFLOW CULVERT INLET
KINGS PARK
KINGS CREEK
GILBERT STREET
MILES FORD BRIDGE ON FROGMORE LAND
LEVEE
KOBIE LANE
SAMMYS CREEK
VICTOR STREET
OVERFLOW CULVERT
COTTON STREET PARK
WELD STREET
PRIVATE BRIDGE
LEVEE
COTTON STREET
PRIVATE ROAD
OVERFLOW CULVERT OUTLET
N
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METERS
the LIST © State of Tasmania
LATROBE LEVEE PROJECT
PROJECT AREA (SOUTH-EAST)
TASMAP: LATROBE
LGA: LATROBE
PROJECT AREA
BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA
Van Diemen CONSULTING
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DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA
CLIENT:
BRIDGE PRO PTY LTD AND LATROBE COUNCIL
DATE: 28 NOV 2021

Attachment B: Offset Areas



Attachment C: Indirect impact monitoring areas



Attachment 2. Latrobe Levee Project (EPBC 2020/8846) Offset Management and Monitoring Plan

LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

CENTRAL NORTH BURROWING CRAYFISH




Latrobe Council$
170 Gilbert Street$
PO Box 63 Latrobe 7307$

Version	Description	Prepared By	Date
1	Draft 1	Latrobe Council with assistance from Van Diemen Consulting Pty Ltd	6-11-2021
2	Final	Latrobe Council with assistance from Van Diemen Consulting Pty Ltd	2-12-2021
3	Final	Latrobe Council with assistance from Van Diemen Consulting Pty Ltd	4-1-2022
4	Final	Latrobe Council with assistance from Van Diemen Consulting Pty Ltd	26-1-2022
5	Final	Latrobe Council with assistance from Van Diemen Consulting Pty Ltd	11-2-2022

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FIGURES

Figure 1 Location of Latrobe township in central north Tasmania

Figure 2 Location of Latrobe township showing key locations and features

Figure 3A Project Infrastructure – full extent with closeup figures shown

Figure 3B Project Infrastructure in north-western section and locations

Figure 3C Project Infrastructure in south-eastern section and locations

Figure 4 Offset Site locations relative to Project Infrastructure

Figure 4A Central north burrowing crayfish attributed burrows near Offset Site 1 – River Road

Figure 4B Central north burrowing crayfish attributed burrows in and near Offset Site 2 – Kings Park

Figure 5 Indirect impact monitoring locations for CNBC burrows and habitat

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
DAWE	Department of Agriculture, Water and Environment (Commonwealth)
EPG	Environment Protection Guidelines (**Attachment 1**)
LC	Latrobe Council
OMMP	Latrobe Levee Project – Offset Management and Monitoring Plan
OP	Operating Procedure – Latrobe Levee Project, Central North Burrowing Crayfish Salvage and Translocation (**Attachment 2**)

Terms

(the) Activity	The construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of setdown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
CNBC Impact Areas	Those areas in the Project Area which are marked by a suitably qualified ecologist with flagging tape or survey marker paint (there are three locations – River Road, Kings Park and Sammy's Creek) from which CNBC are to be salvaged for translocation.
Contractor	The company/entity awarded the contract by LC to perform the works.
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: River Road (Figure 4A, Attachment 4) and Kings Park (Figure 4B, Attachment 5).
Project	The Latrobe Levee Project (EPBC 2020/8846)
Project Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Tasmania Trail	The trail from Devonport to Dover that is managed by the Tasmanian Trail Association - see http://www.tasmaniantrail.com.au/ for further information.

PREFACE

The Latrobe township is located in the lower Mersey River catchment along the mid-north coast of Tasmania. In 2016, the highest floods on record were experienced in the Mersey River at Latrobe Bridge, which inundated a large area of the township. The severity of the June 2016 flood and the subsequent impact on the Latrobe township led Latrobe Council (LC) to propose the installation of flood mitigation measures for the township.

The Project

Latrobe Council has proposed to construct levees around the township's south-western and southern perimeter as well as a flood gate structure (lower Kings Creek) and a peak-flow flood diverter on Kings Creek at Kings Park (the 'Project'). The levee system has been designed to reduce the risk of flooding from the Mersey River and Kings Creek to the Latrobe township but does not permanently impound water. Rather, the levee is to prevent floodwaters entering the town's central business district and nearby residential areas during a significant flood event.

The Impact to Matters of National Environmental Significance

The DAWE Policy Statement[1] 'Definition of 'action' outlines the meaning of the term 'action' under the EPBC Act. In this case the Project is an 'action'. The EPBC Act prohibits taking an 'action' that has, will have, or is likely to have a significant impact on the matters protected under Part 3 of the EPBC Act, without approval. Understanding the definition of an 'action' is therefore crucial to understanding whether the EPBC Act applies.

Under the EPBC Act, all actions[2] which may have a significant impact on matters of national environmental significance (defined as 'controlled actions') must receive prior approval from the relevant Minister through an environmental assessment process, administered by the DAWE. The Project (an 'action') was classified a controlled action by DAWE (EPBC 2020/8846) because it would impact *Listed threatened species and communities* (sections 18 and 18A of the EPBC Act). The Project requires approval under the EPBC Act before it could proceed because of the likely impact to the endangered central north burrowing crayfish (*Engaeus granulatus,* CNBC).

Impact avoidance and mitigation measures for CNBC are described for the Project in the Preliminary Documentation[3].

The residual impact to the CNBC is to be offset by the creation/enhancement of habitat at two Offset Sites.

[1] Refer also to the EPBC Act Policy Statement - Definition of 'action': Section 523, section 524, and section 524A of the EPBC Act. Department of Sustainability, Environment, Water, Population and Communities, 2013.

[2] An action is defined broadly in the EPBC Act and includes: a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. A lawful continuation of an existing use is not an action. A decision by a government body to grant an authorisation (for example, a permit or licence) or to provide funding is not an action. Actions include, but are not limited to: construction, expansion, alteration or demolition of buildings, structures, infrastructure, or facilities; storage or transport of hazardous materials; waste disposal; earthworks; impoundment, extraction and diversion of water; research activities; vegetation clearance; military exercises and use of military equipment; and sale or lease of land.

[3] Latrobe Levee, Latrobe - Preliminary Documentation (EPBC: 2020/8846). November 2021.

Latrobe Council has prepared this Offset Management and Monitoring Plan (OMMP) with assistance from Van Diemen Consulting Pty Ltd.

The OMMP compiles information about the Offset Sites and includes the following: -

- Describes the method of salvage and translocation of CNBC from the Impact Areas to the Offset Sites,
- Outline the methods to create a **minimum** of 2,050 square metres of habitat suitable for occupation by CNBC – it is proposed that 2,330 m^2 of CNBC suitable habitat be created at River Road (1,845 m^2) and Kings Park (485 m^2) in a manner consistent with the *EPBC Act Environmental Offsets Policy*,
- Describe the management actions to establish, improve and maintain CNBC habitat within the Offset Sites,
- Provide a timetable of management actions, outcomes, and progress reviews,
- Detail appropriate monitoring and evaluation of management actions and completion criteria; and,
- Attain and maintain the offset completion criteria for the life of the EPBC Act approval for EPBC 2020/8846.

PART A - INTRODUCTION

A.1 Project Background

The Latrobe township is located in the lower Mersey River catchment along the mid-north coast of Tasmania (**Figure 1**). In 2016, the highest floods on record were experienced in the Mersey River at Latrobe Bridge, which inundated a large area of the township. The severity of the June 2016 flood and the subsequent impact on the Latrobe township led LC to propose the installation of flood mitigation measures for the township.

Latrobe Council has proposed to construct a levee system to reduce the risk of flooding from the Mersey River and Kings Creek to the township of Latrobe. These water courses flow past and through the town respectively (**Figure 2**). The levees are to be built around Latrobe township's south-western and southern perimeter as well as a flood gate structure (lower Kings Creek) and a peak-flow flood diverter on Kings Creek at Kings Park (**Figures 3A, 3B and 3C**).

The Project will cause a direct impact to the endangered[4] central north burrowing crayfish (*Engaeus granulatus*). The application of impact avoidance and mitigation measures to the species still left a residual impact which will be offset via the creation of habitat at other locations (**Figure 4**).

A.2 Central North burrowing crayfish

A.2.1 Description and habitat

The Central North burrowing crayfish (*Engaeus granulatus*), as its name suggests, is endemic to the central north region of Tasmania. The range of the species has been expanded over the past 10 years as additional survey work have located new populations. Its stronghold is the Devonport – Spreyton – Latrobe region.

The species occupies seeps, tea-tree swamps, wet forest areas, wetlands and stream banks in relatively undisturbed habitats and roadside and agricultural drain networks. There are many recorded locations of the species in roadside drains, wet areas within pastures and in the yards of residential properties. Usually all that can be seen of a burrowing crayfish is a burrow entrance, often with a raised 'chimney' of pelleted mud surrounding it. High water flow habitats or those subject to frequent flood or rapid water flow events tend to have burrows without the distinctive 'chimney' because it is washed away. Dense grass and weed cover of the ground can often limit the observation of burrows, and on occasion 'chimneys' are seen in tall grass habitats because the grass helps support the mud pellet structures.

A.2.2 Identification of species at Offset Sites

The survey methods and data recording techniques applied at the Activity Site were applied at the Offset Sites to maintain consistency of search effort and comparability in data interpretation.

Based on the published distribution maps for this species[5], the Survey Area does not overlap with any other burrowing crayfish species; therefore, the presence of a burrow/chimney was assumed to be an observation of CNBC. This approach is consistent with the DSEWPAC (2011) survey guidelines: 'In areas where only one burrowing crayfish species occurs, the presence of crayfish burrows confirms the presence of that species'.

[4] Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

[5] Richardson, A., Hopgood-Douglas, S., Munks, S. Doran, N. and Peters, D. (2008). Predicting the distribution of a threatened freshwater Burrowing Crayfish: *Engaeus granulatus* in Central Northern Tasmania. *Freshwater Crayfish* **16**:43-46.

When excavation for the Activity occurs the burrowing crayfish species can be positively identified as part of the salvage and translocation process.

A visual walkover survey was conducted by VDC (2021) as prescribed in the Commonwealth referral guidelines (DSEWPC, 2011). Burrows were recorded with a Leica land survey grade GPS to establish an accurate location and height data for each burrow. Habitat for CNBC was also recorded with the Leica GPS.

A.2.3 Impact from Project

The VDC (2021) survey and assessment calculated the direct impact to CNBC as – habitat (about 635.82 square metres) and burrows (66) – for the three CNBC Impact Areas at Kings Park, River Road and Sammy's Creek (see **Table 1**).

The design and method of habitat creation is the subject of this *Offset Management and Monitoring Plan*.

CNBC will be salvaged and translocated from the Project Impact Areas to the Offset Sites – those CNBC near River Road and Sammy's Creek will be translocated to the River Road Offset Site (**Attachment 4**), and those at Kings Park will be translocated to the Kings Park Offset Site (**Attachment 5**). The salvage and translocation methodology is described in **Attachment 2**.

Table 1. Habitat and burrows of central north burrowing crayfish directly lost by the Project

CNBC Impact Area	Habitat Loss (square metres)	Burrows Lost (number)	Burrow density (number/m^2)
River Road	287.48	47	0.09
Kings Park	301.67	13	0.04
Victor Street	46.67	1	0.02
TOTAL	**635.82**	**66**	
Minimum Offset Required	**2,050**		**0.05**

A.3 Objectives

The objectives of this OMMP are to:

- Describe the method of salvage and translocation of CNBC from the Impact Areas to the Offset Sites,
- Outline the methods to create the proposed 2,330 m^2 of CNBC suitable habitat at River Road (1,845 m^2) and Kings Park (485 m^2) in a manner consistent with the EPBC Act Environmental Offsets Policy – the minimum required offset is 2,050 m^2 so the objective exceeds the minimum required,
- Describe the management actions to establish, improve and maintain CNBC habitat within the Offset Sites,

- Provide a timetable of management actions, outcomes, and progress reviews,
- Detail appropriate monitoring and evaluation of management actions and completion criteria; and,
- Attain and maintain the offset completion criteria for the life of the EPBC Act approval for EPBC 2020/8846.

This OMMP is consistent with regional priority recovery and threat abatement actions in the Department of Environment's *Approved Conservation Advice for* Engaeus granulatus *(Central north burrowing crayfish)* (DoEE 2008[6]), including:

- monitor population trends, and
- determine specific threats to known colonies and appropriate actions to abate them.

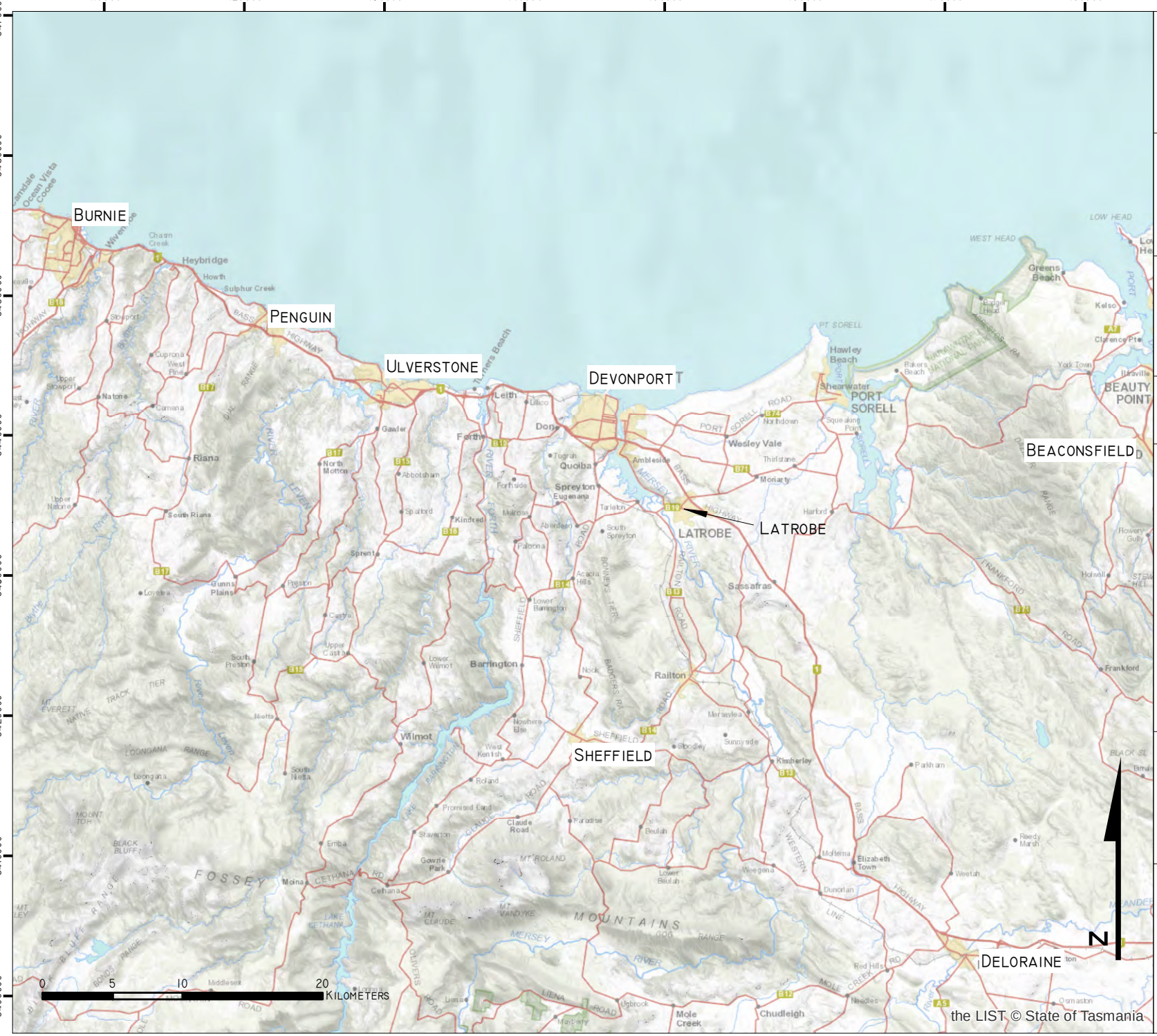
[6] Department of the Environment, Water, Heritage and the Arts (2008). Approved Conservation Advice for *Engaeus granulatus* (Central North Burrowing Crayfish). Canberra: Department of the Environment, Water, Heritage and the Arts.

LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

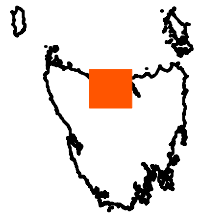
FIGURE 1: LOCATION OF LATROBE TOWNSHIP IN CENTRAL NORTH TASMANIA

TASMAP:	LGA:
LATROBE	LATROBE



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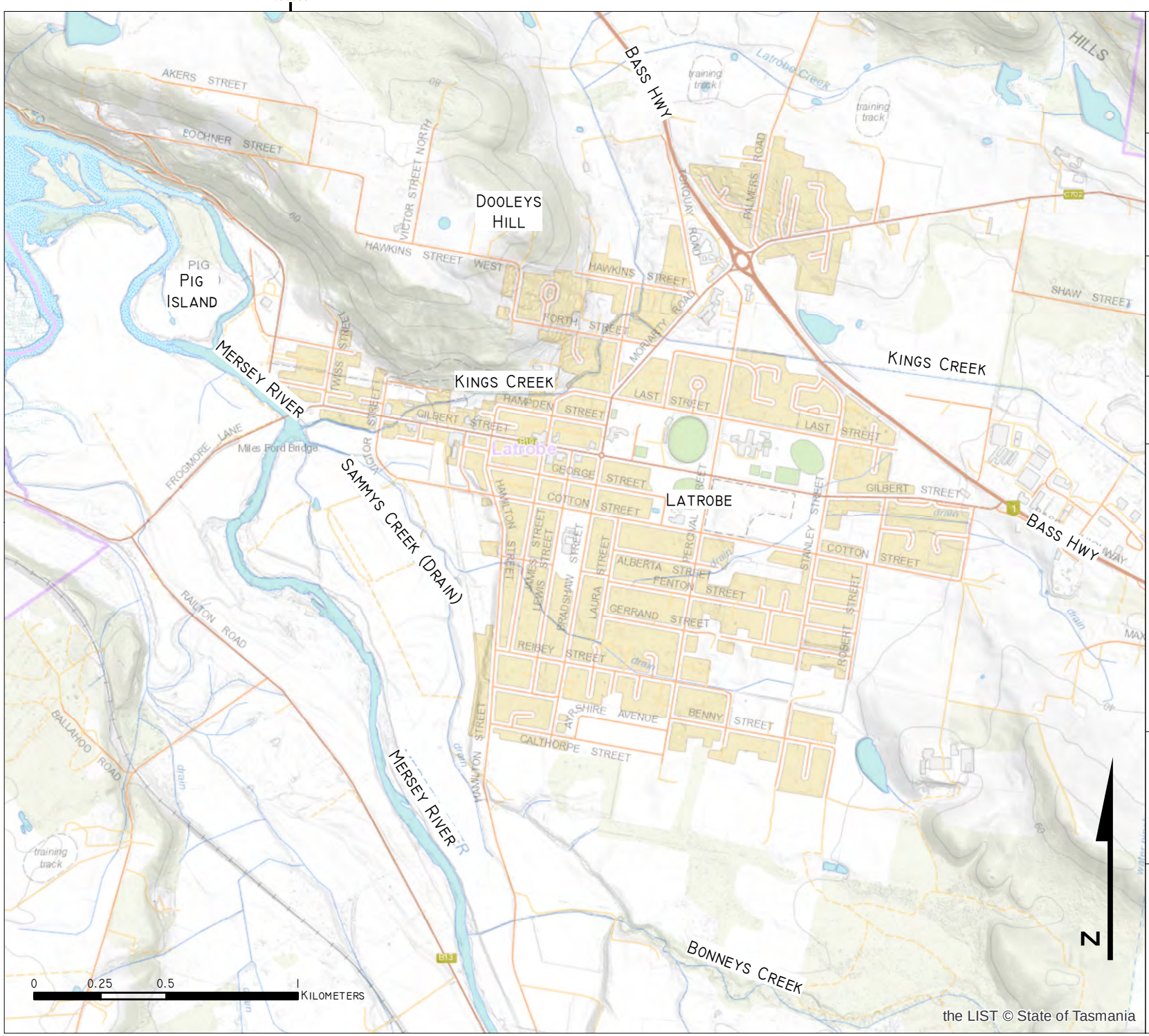
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OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 2: LOCATION OF LATROBE TOWNSHIP SHOWING KEY LOCATIONS AND FEATURES



TASMAP: LATROBE

LGA: LATROBE

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LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 3A: PROJECT INFRASTRUCTURE – FULL EXTENT WITH CLOSEUP FIGURES SHOWN

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OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 3B: PROJECT INFRASTRUCTURE IN NORTH-WESTERN SECTION AND LOCATIONS

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LATROBE	LATROBE

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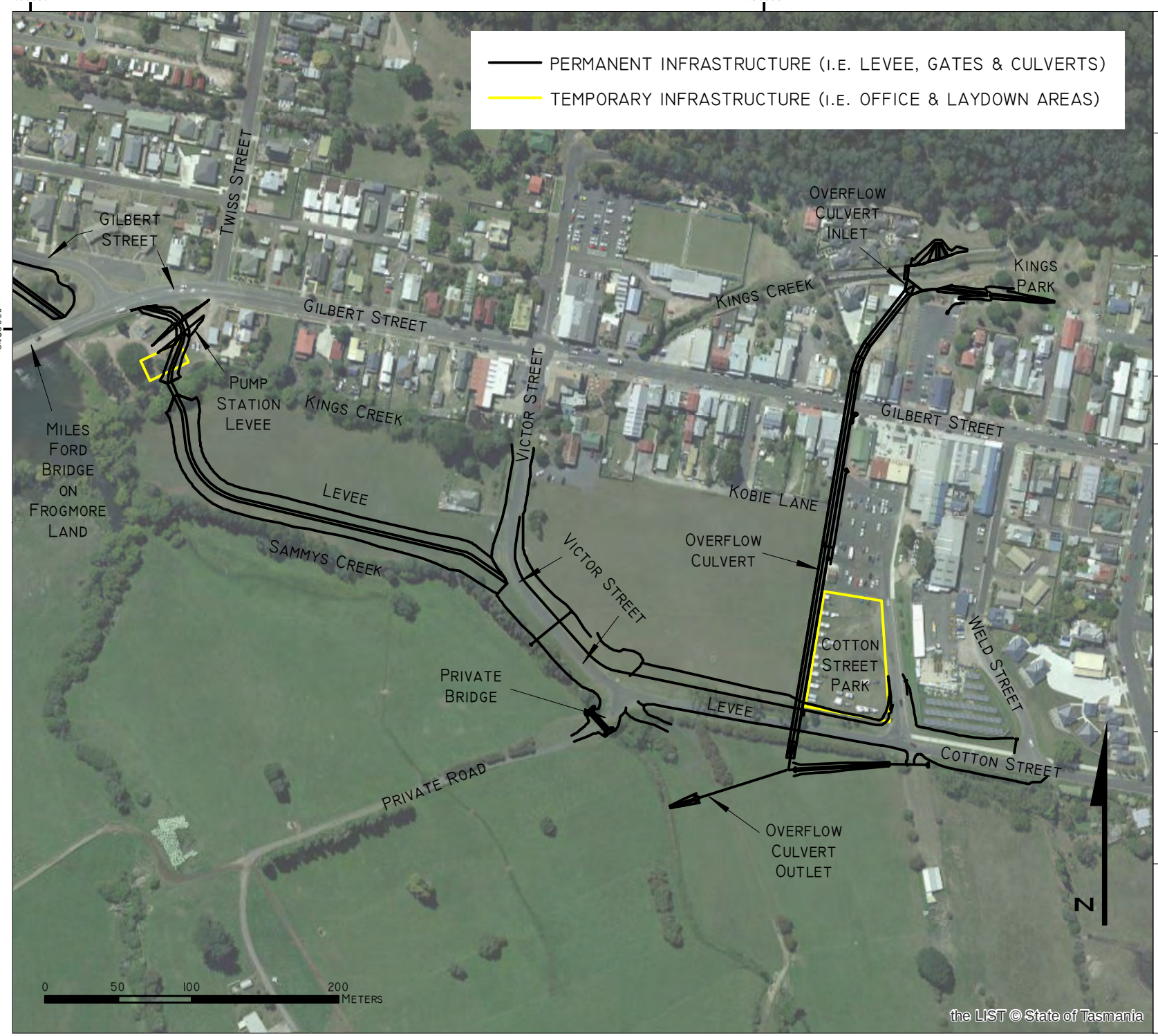
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LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 3C: PROJECT INFRASTRUCTURE IN SOUTH-EASTERN SECTION AND LOCATIONS

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A.4 Offset Site security, and management and reporting responsibilities

Details of Offset Site security and management responsibilities are shown in **Table 2**.

A.4.1 Security

The Offset Sites will be secured by the following actions: -

1. continued ownership of the land by Latrobe Council (the LC), and the
2. listing of the Offset Sites on the LC Asset Register, and with
3. ongoing management performed by the LC Works Crew through the Annual Works Program.

A.4.2 Community involvement and engagement

The Offset Sites will likely be visited by community members, school groups and those interested in Landcare and conservation-oriented projects and works. Signage and designated access points will be established as part of the OMMP to encourage interest in the CNBC, the project that gave rise to the offset sites and CNBC created habitat and the significance of the CNBC in the region.

Once established, a community group or Landcare group may assist with the plantings of trees and shrubs as remedial works to the site(s) and to also assist with weed control. Access will be coordinated by LC as the responsible party for the Offset Sites and overarching control and responsibility of the management of the sites. Further details are provided in section D.3 Community awareness of the Offset Sites and CNBC.

A.4.3 Management

The Offset Sites will be managed by the Latrobe Council, with suitably qualified persons or organisations may be engaged to assist with site management activities or the provision of management advice. Further information is provided in PART D – OFFSET SITE MANAGEMENT.

A.4.4 Reporting

The Latrobe Council is responsible for all reporting, monitoring and reviews of the OMMP but will engage suitably qualified persons and/or organisations to assist with this process. Further information is provided in PART F - REPORTING.

Table 2. Security and Management Responsibility and Reporting Requirements

Who is liable/responsible for meeting offset requirements?	Latrobe Council
Type of security	LC Asset Register – Reserve with management requirements and operational constraints
Offset site management responsibility	Latrobe Council
Communication and liaison with the community and stakeholders	Latrobe Council
Communication and liaison with adjacent landowners	Latrobe Council

Monitoring – construction phase, ecological etc.	Latrobe Council
Reporting responsibility to DAWE	Latrobe Council
Plan review	Latrobe Council to initiate and prepare draft, approval required from DAWE

A.5 Structure of the Plan

The plan addresses the requirements of guidelines for the preparation of an OMP under the EPBC Act Environmental Offsets Policy (Commonwealth of Australia 2012).

The OMMP contains the following components –

Part A	*Background* to the Project and the need for and scale of the offset to address the residual impact to the endangered central north burrowing crayfish (*Engaeus granulatus*) caused by the Project.
Part B	*Offset Strategy* which identifies the Offset Sites where CNBC habitat will be created, Offset Site security, and ongoing management and reporting responsibilities.
Part C	*Establishing the Offset Sites* including inductions for site workers, marking out procedures, earthworks required, construction site hygiene, plantings, weed control procedures, signage, detailed design, and existing and likely infrastructure at each of the Offset Sites.
Part D	*Offset Site Management* procedures including the management constraints and measures to be applied at Offset Sites, management actions and their timing, and communication methods with adjoining landowners and the broader community and stakeholders.
Part E	*Monitoring and adaptive management* procedures including completion criteria for the offset outcomes, method for identifying remedial works, and the possible nature of remedial works.
Part F	*Reporting* requirements including the collection of data and making of records during the construction part of the Project (especially during CNBC salvage and translocation), annual reporting of the outcomes of the OMMP, and the process of modifying the OMMP.
Part G	*Attachments* referenced in the OMMP.

PART B – OFFSET STRATEGY

This section provides details of the impact to CNBC caused by the Activity, assesses the suitability of the proposed Offset Sites, and includes details regarding . The location of the Activity and the proposed Offset Sites are provided in Figures 4A.

B.1 Offset Site Details

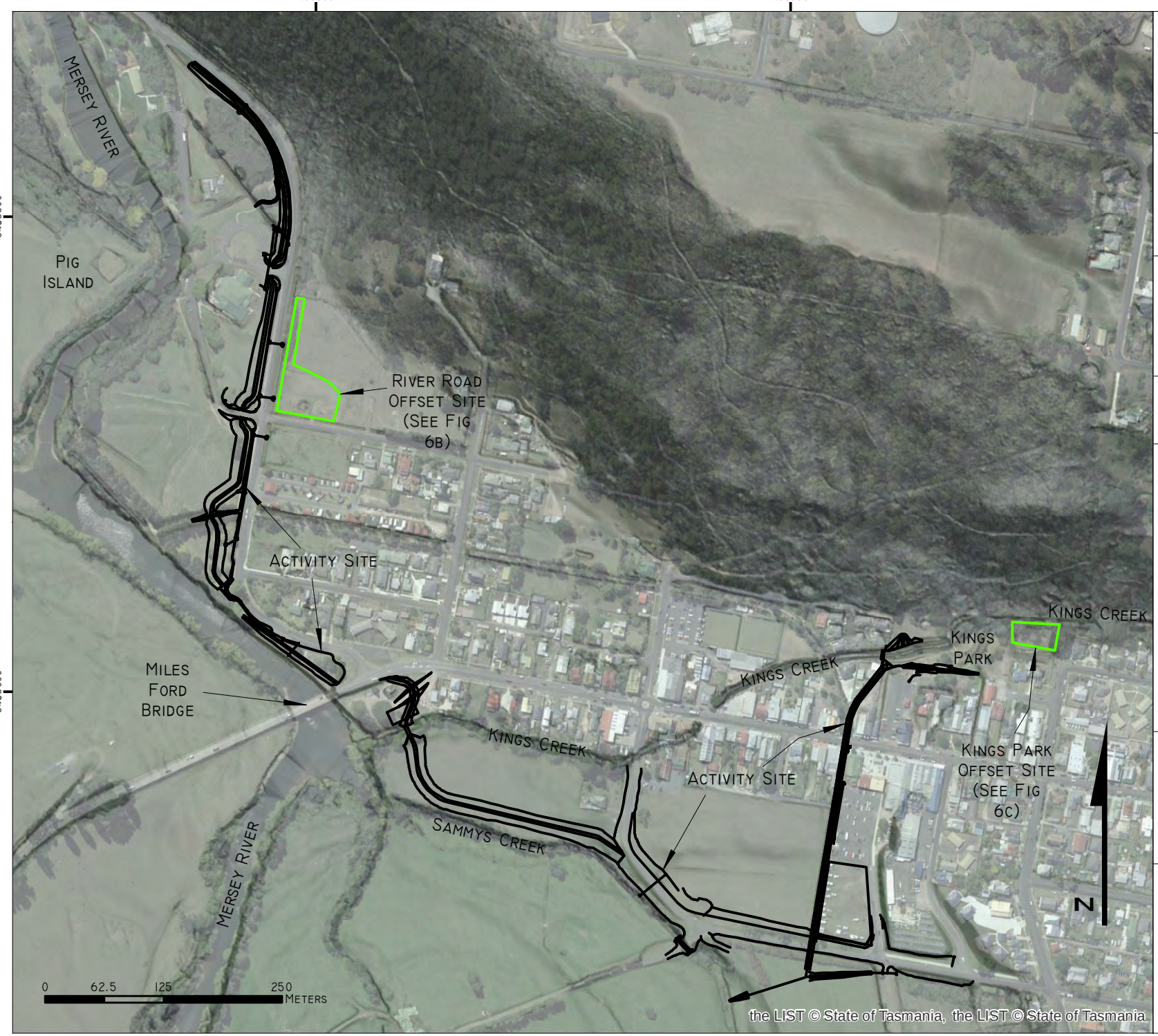
The Offset Sites – River Road and Kings Park (**Figure 4B and 4C**) – were chosen after careful consideration of the land tenure and long-term security prospects of the site, potential for habitat at the site to be enhanced and/or habitat areas created and sustained for the long-term for CNBC and the quantum of the residual impact needing to be offset.

VDC (2021) conducted surveys of the Offset Sites to determine the presence of CNBC burrows and/or their habitat, other MNES, and the suitability of the landforms present to be transformed into habitat that is likely suitable for CNBC translocation and natural ongoing colonisation by the species. The Offset Sites are land owned and managed by the LC and area available long-term for CNBC habitat creation and/or enhancement.

Table 3 provides details of the address, tenure, and the amount of area at each Offset Site to be created as CNBC habitat.

Table 3. Offset Site location and land tenure

Attribute	Offset Site 1	Offset Site 2
Reference Name	River Road Offset Figure 4B	Kings Park Offset Figure 4C
Physical Address	RIVER RD LATROBE TAS 7307	HAMILTON ST LATROBE TAS 7307
Access	Last Street West	Kings Lane and Kings Park
Certificate of Title (PID)	223225/1, 153484/1, 46134/7, 233419/1 (3170515)	25603/7 (6537888)
Landowner	Latrobe Council	Latrobe Council
Approximate size (m^2)	3,311	1,169
Potential CNBC habitat created (m2)	1,845	485



LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 4A: OFFSET SITE LOCATIONS RELATIVE TO PROJECT INFRASTRUCTURE

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OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 4B: CENTRAL NORTH BURROWING CRAYFISH ATTRIBUTED BURROWS NEAR OFFSET SITE 1 – RIVER ROAD

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LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 4C: CENTRAL NORTH BURROWING CRAYFISH ATTRIBUTED BURROWS IN AND NEAR OFFSET SITE 2 – KINGS PARK

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B.2 Description of Offset Site 1 – River Road

B.2.1 Location and access

The Offset Site is located on the junction of River Road and Last Street West, with an existing access from Last Street West. The location has been used for the temporary housing of horses by those participating in the Tasmanian Trail – Latrobe is on the route from Devonport to Dover.

Part of the location will be fenced to limit the existing use (horse agistment) to the eastern side of the Council owned land. The Offset Site is to be kept livestock and horse free. Pedestrians will be able to access the location except during maintenance works. A small gate will be provided at the southern end of the site to enable pedestrian access.

The site will not be accessible to vehicles, motorised bikes or other form of machinery unless approved by the LC as part of maintenance or remedial works. Access to the site by authorised vehicles will be via a gate (locked – must get key from LC) at the southern end of the site.

B.2.2 Existing Uses

The Offset Site is part of several parcels of land owned by the Latrobe Council (see **Attachment 4**). The land parcels are currently used to agist horses used by participants of the Tasmania Trail (the Trail) – (see http://www.tasmaniantrail.com.au/ for further information).

The Tasmanian Trail is the only long distance (480km) multi-use trail in Tasmania. The experience is recreational, cultural and nature based, and it often passes through or close to small towns, allowing travellers to visit local attractions while using as little or as much as they like and to take advantage of local accommodation, hospitality, and specialist services. The Tasmanian Trail Association manages the Trail through a volunteer structure with very active support of community groups, local government bodies and regional organisations.

The use of some of the land parcels will continue for the Tasmania Trail, as shown in **Attachment 4**, with fencing erected to delineate and keep separate the two uses – conservation management and horse agistment for recreation. The use of land for horse agistment adjacent to land for conservation management of CNBC and its habitat is not considered to be detrimental – the impact of the adjacent use will be monitored to confirm this.

B.2.3 Existing CNBC burrows and habitat

No CNBC burrows are present in the Offset Site although the roadside drains adjacent – River Road and Last Street West – were observed to support 26 CNBC burrows when the surveys were conducted (see **Figure 4B**). It is likely that the existing and ongoing use of the paddocks for stock (e.g., horses) has prevented colonisation by CNBC – burrows can be easily pugged by hooved animals, and it has been observed over many years by VDC staff that such managed habitats can be devoid of CNBC. Some native sedges and semi-aquatic species are already present, as too are exotic semi-aquatic herbs as well as pasture herbs and grasses.

The presence of CNBC in roadside drains adjacent to the Offset Site is a direct source for the colonisation of CNBC into the Offset Site, in addition to CNBC salvaged from the works sites at River Road and Victor Street.

The CNBC adjoining locations would be unaffected by the Offset Site works – measures would be applied to isolate those locations from works at the Offset Site (e.g., signage and fencing, inductions for staff and contractors). The water table is likely to be near surface in winter and at shallow depth during summer given the nearby occurrence of springs from Dooleys Hill and Mersey River.





Low-lying wet area adjacent to River Road that can be enhanced for CNBC





Wet soaks and low-lying points in the paddock can be enhanced to be CNBC habitat



A catch drain at the northern end of the site can be used to direct water to create habitat



Roadside drains in Last Street West provide a source of CNBC recruitment to the Offset Site

B.2.4 Signage

The Offset Site will have signage installed at the entrance to the property to advise those attending the site and adjoining land (used by Tasmanian Trail participants for temporary horse housing) of the importance of the reserve. The signage would include information about and imagery of the CNBC and the importance of the region for the species, and the do's and don'ts in the reserve.

B.2.5 Proposed Layout

The layout of the proposed Offset Site relative to the Council owned land at the River Road site is shown in **Attachment 4**.

Fencing

The location of new fencing (to delineate the Offset Site from other uses) is shown in **Attachment 4**. While horses would occasionally be agisted in the non-Offset Site portion of the Council owned land, the Offset Site would have stock and horses totally excluded. Water from the non-Offset Site portion of the Council owned land would be directed to the Offset Site to maintain, as far as possible and subject to rainfall patterns, wet to damp conditions for the CNBC created habitat.

The style of fencing is depicted below. The form of the proposed fence needs to resist horse rubbing, which is best achieved by the use of a wooden frame and top rail as it avoids the use of electric tape which would otherwise bring ongoing maintenance and safety issues for those attending the reserve or land adjacent.



Earthworks and drainage

The existing topography of the Offset Site can be enhanced to increase the longevity of surface water to promote longer periods of damp soils suitable for CNBC habitation.

An existing roadside drain in last Street West and a cut-off drain at the northern end of the Council owned land will be used to enhance surface water inputs into the Offset Site. The works are minor. Shallow sections of the site (150-300 mm) would be scalped to remove the top layer of grass/clover and associated pasture species and flipped onto the higher and drier areas to enhance the exposed soil area. CNBC prefer to colonise unvegetated areas, and the scalping will also deepen the existing depressions (marginally) to further enhance the retention of surface water.

The central area of the Council owned land is already receiving water from the existing drain at the north-east of the site, and generally directs it to the south-eastern corner (Offset Site area) via an existing drain that runs parallel to the River Road. The water moving through this existing drainage system will be enhanced in volume by the installation of a small blockage at the north-western end of the drain. There is no change in direction of water flow as all of it reports to the River Road roadside drain, and then to the drain that feeds into Bells Parade.

B.2.6 Plantings

Tubestock will be planted to establish a suitable ground layer coverage and shelter for CNBC. A mix of structural elements will be planted including trees, shrubs, sedges, grasses, and rushes. The tree layer is intended to be sparse to ensure that soil drying is not excessive, while establishing some shade cover and shelter to the ground layer.

A list of species that should be planted at the location, including planting densities is provided in **Table 4**.

B.2.7 Weed management

Weed control and eradication works will be applied on an 'as required' basis following assessment of the site during each reporting period. Spanish heath (*Erica lusitanica*), and gorse (*Ulex europaeus*) are two weed species that need to be closely monitored and weed control works undertaken.

B.2.8 Recreational infrastructure

LC may install and maintain mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation.

The location of the proposed footbridge for the Kings Park Offset Site is depicted in **Attachment 5**. The footbridge will provide a clearly delineated accessway through the Offset Sites to avoid impact from unguided or uncontrolled access. The site is likely to be wet to damp most of the time, and hence it is likely to be unattractive for people to traverse it if a walkway is provided. The walkway will not interfere with hydrological flow of the site.

There is to be a gate into the River Road Offset Site (see **Attachment 4**) to provide access to machinery that needs to access the site for remedial works, otherwise pedestrian access only will be provided (via a smaller gate adjacent to the larger gate). Immediately on entry to the site is a raised area on which picnic tables and some signage will likely be installed once the site is established and CNBC colonising the area. The 'high point' is not habitat for CNBC and nor is it proposed to make it habitat, rather it is included for landscape context and to enable trees and shrubs to be planted around its edge with the wet/damp areas. The picnic tables are unlikely to cause any impact to the habitat being created. The location is highly visible from River Road and has houses nearby, so it is unlikely to be damaged or vandalised.

No toilets or other effluent creating amenities will be constructed in the Offset Site.

Table 4. Plant species name and lifeform for tubestock plantings for River Road Offset Site

Common name	Species name	Life Form	Approximate density
Black gum	*Eucalyptus ovata*	Tree	1 per 100m^2
Blackwood	*Acacia melanoxylon*	Large shrub to tree	1 per 100m^2
Swamp paperbark	*Melaleuca ericifolia*	Large shrub to tree	1 per 50m^2
Manuka	*Leptospermum scoparium*	Large shrub	1 per 5-10m^2
Cutting sedge	*Carex appressa*	Sedge	1 per 5m^2
Tassel sedge	*Carex fascicularis*	Sedge	1 per 5m^2
Tussock grass	*Poa labillardierei*	Tussock forming grass	1 per 5m^2
Pale rush	*Juncus pallidus*	Tall rush	1 per 20m^2
Knobbly rush	*Ficinia nodosa*	Short rush	1 per 20m^2

B.3 Description of Offset Site 2 – Kings Park

B.3.1 Location and access

The Offset Site at Kings Park has several stormwater inputs and is a naturally damp area with shallow topographic depressions adjacent to Kings Creek (so water table is not very deep) and there is opportunity to deepen the existing water pooling areas.

B.3.2 Existing Uses

The Offset Site is part of several parcels of land owned by the Latrobe Council which together form the Kings Park – Dooleys Hill walking circuit and parkland. The Offset Site is at the eastern most extent of Kings Park. Other than walkers or people using the parkland for recreation (e.g., dog walking, jogging, picnicking) there are no other existing uses for the land identified as the Offset Site.

B.3.3 Existing CNBC burrows and habitat

CNBC are present in the Kings Park with burrows present on both sides of the embankment in and adjacent to the Offset Site. The CNBC would be unaffected by the Offset Site works.

This Offset Site would receive the CNBC translocated from the Kings Park impact area.





Drain to Kings Creek associated with water ponding area at rear of the Offset Site



Hamilton Street stormwater provides a water source



Wet area with water ponding in soil/boggy area

B.3.4 Signage

LC will install signage at the main entrance to Kings Park and minor signage at the eastern and western entry to the Offset Site. The signage would include information about and imagery of the CNBC and the importance of the region for the species, and the do's and don'ts in the reserve.

B.3.5 Layout

The layout of the proposed Offset Site relative to the Council owned land at the River Road site is shown in **Attachment 5.**

Earthworks and drainage

The existing topography of the Offset Site can be enhanced to increase the longevity of surface water to promote longer periods of damp soils suitable for CNBC habitation. Two stormwater drains (one at each side of the Offset Site) provide surface water input to the area. Drainage is naturally to Kings Creek via three shallow surface drains which will be slightly impeded by rock installation to aid the habitat creation process.

Shallow sections of the site would be scalped to remove the top layer of grass/clover and associated pasture species and flipped onto the higher and drier areas to enhance the exposed soil area. CNBC prefer to colonise unvegetated areas, and the scalping will also deepen the existing depressions (marginally) to further enhance the retention of surface water.

Retaining Wall

A small retaining wall will be installed during the Offset Site development to delineate the boundary of the Offset Site with adjacent private freehold titles.

B.3.6 Plantings

Tubestock will be planted to facilitate the establishment of suitable ground layer coverage and shelter for CNBC. No trees or shrubs are suggested because the site already has tall blackwood to the north of the Offset Area (to provide some dappled shade) and it is adjacent to private freehold land where additional trees at the rear of their boundary may cause issues with solar access to both buildings and backyard.

A list of species that should be planted at the location, including planting densities is provided in **Table 5**.

Table 5. Plant species name and lifeform for tubestock plantings for Kings Park Offset Site

Common name	Species name	Life Form	Approximate density
Cutting sedge	*Carex appressa*	Sedge	1 per 5m^2
Tassel sedge	*Carex fascicularis*	Sedge	1 per 5m^2
Tussock grass	*Poa labillardierei*	Tussock forming grass	1 per 5m^2
Pale rush	*Juncus pallidus*	Tall rush	1 per 20m^2
Knobbly rush	*Ficinia nodosa*	Short rush	1 per 20m^2

B.3.7 Weed management

Weed control and eradication works will be applied on an 'as required' basis following assessment of the site during each Reporting Period. Spanish heath (*Erica lusitanica*), and onion weed (*Asphodelus fistulosus*) are two weed species that need to be closely monitored and weed control works undertaken.

B.3.8 Recreational infrastructure

LC may install mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation. Wooden footbridge sections may be installed at the northern side of the Offset Site, adjacent to the Kings Creek (on the high points in the Offset Site) for walkers to traverse the area without interference to the CNBC habitat.

No toilets or other effluent creating amenities will be constructed in the Offset Site.

B.4 Offset quantification

The *Offsets Assessment Guide* gives effect to the offset principles in the *EPBC Act environmental offsets policy* and provides a decision-making framework for DAWE to consider the appropriateness and adequacy of proposed offsets for listed threatened species and ecological communities. A summary of the key assumptions and methods outlined in the *Offsets Assessment Guide* and how they have been applied to the Project is provided below.

B.4.1 Quality

The quality score for area of habitat or community is a measure of how well a site supports a threatened species or ecological community and contributes to its ongoing viability. The assessment of 'quality' is not simply a scoring of vegetation 'pristineness'.

Habitat quality has three components:

- *Site condition*: This is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes for example vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.
- *Site context*: This is the relative importance of a site in terms of its position in the landscape, considering the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.
- *Species stocking rate*: This is the usage and/or density of a species at a site. The principle acknowledges that a site may have a high value for a threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site regarding a species population or, in the case of a threatened ecological community this may be several different populations. It also includes consideration of the role of the site population regarding the overall species population viability or community extent.

These components contribute to the final habitat quality score used in the EPBC Offset Calculator, however the weighting given to each component is dependent on the ecological requirements of the impacted species or ecological community. For example, for some species the most important consideration is the location of a site in the landscape, whereas for others it is the presence of the species itself.

In the offset calculator, start quality should be the quality of the offset site at the time of assessment. The two future values of quality in the offset calculator - future quality without offset and future quality with offset - should be estimated at the time at which the ecological benefit of the offset is expected to be realised (this time is input at time until ecological benefit). Future quality without offset is the estimate of the habitat quality at this future time based on a business-as-usual scenario – that is, considering current management practices, use of the site and historic trends for the quality of habitat on the site. Future quality with offset should be the estimated habitat quality at the same future time incorporating the proposed offset activities.

Table 8 provides information on how the *quality* attribute was interpreted in the EPBC Offset Calculator for areas of CNBC habitat impacted directly by the Activity, including the three components that comprise *quality*.

All three sites were treated as one entity for the purpose of quantifying the impact.

G.4.2 EPBC Calculator Characteristics of Offset Areas

Characteristics of the Offset Sites were used to populate the 'offset' columns of the EPBC Calculator sheet.

The Offset Sites were assessed as a single entity in the EPBC Calculator sheet because of their –

- comparability of habitat quality present (both are non-native vegetation and include areas of bare ground),
- landform present (both are alluvial flats of clay, silt, and gravels, associated with stream formations and springs),
- adjacency of known CNBC burrows (and suitable habitat – mainly roadside drains, or wet/riparian areas in recreational parkland), and a
- lack of key life history traits expressed at either site to suggest ongoing recruitment and likely persistence.

Principally, the difference between the Offset Sites **in their current form** is that the Kings Park site supports some (16) CNBC burrows. CNBC are present in a very small area of the Kings Park. Burrows were well developed with 6 of the 16 (37.5%) being active (based on recently moved soil at the chimney) and there were only large burrows (no burrows in the <15mm width class) present.

The absence of CNBC at the River Road Offset Site does not reflect the prospective suitability of the habitat present to be able to support CNBC, rather it is likely to be a direct consequence of the site's current management arrangements (i.e., periodically stocked with horses and other livestock).

While the presence of CNBC is considered to be a critical component to determine CNBC habitat quality, CNBC 'presence' also includes the life history traits expressed at the site. These traits include the size ranges of burrows (various size classes suggests recruitment, prolonged and sustained occupation of the habitat which makes it more important) and proportion that are active.

Other parameters used in the EPBC Offset Calculator are described below in the context of CNBC.

<u>Time over which loss is averted</u>

The time over which loss is averted is the foreseeable timeframe (in years) over which changes in the level of risk to an offset site can be considered and quantified. That is, it is the time that any measures for securing a site for conservation purposes, such as conservation covenants on title, are intended to last. Longer time frames are valued more highly than shorter time frames. This component is connected to the risk of loss (%) with, and without the proposed offset, as it defines the time over which these risks are estimated.

The Offset Sites are in the ownership of Latrobe Council which provides secure longevity of the conservation management measures proposed. Consequently, a timeframe of 20 years has been applied in the EPBC Offset Calculator even though the mechanism is to be applied in perpetuity (given the impact is permanent).

Time until ecological benefit

The time until ecological benefit is the estimated time (in years) that it will take for the habitat quality improvement of the offset to be realised. This component is connected to the future quality with offset, and future quality without offset, as it defines the future point in time for which these quality scores are predicted.

As a conservative measure for the current project EPBC 2020/8846, 10 years to ecological benefit has been used in the EPBC Offset Calculator. While it is expected that the desired benefit would be achieved quicker (likely to be 3 years based on the Clayton Reserve offset site for EPBC 2011/6095), it may require 5 or up to 10 years of observations supported by some empirical data to demonstrate a trend in habitat improvement that is self-sustaining or requires little intervention.

The Clayton Reserve (including the Squibbs Road project) used as an offset site for the Sheffield Road project (EPBC 2011/6095) in the Devonport City Council Municipality met the criteria for CNBC habitat created and numbers achieved to offset the loss/impact at Sheffield Road in less than 3 years.

The compliance reports prepared for the Clayton Reserve (EPBC 2011/6095) project can be found at the Devonport City Council webpage - https://www.devonport.tas.gov.au/ and search for 'Central North Burrowing Crayfish'.

Future Quality

The future quality of the areas without the Offset Sites is set at 4 because there is unlikely to be any positive change to the parameters, especially the number of CNBC with current management practices.

Future quality is expected to be 8, with improvement in the Species Stocking Rate to at least 5 out of the 6 allocated points. Site condition and context are scored the same for the Activity and Offset Sites. The approach essentially means that the Species Stocking Rate is the driver of Quality.

To understand what has to be achieved at the Offset Sites, we need to consider the Species Stocking Rate at the Activity Site relative to what is currently at the Offset Sites. **Table 8** provides the number of burrows and extent of habitat being lost at each of the three sites; Victor Street, River Road and Kings Park. It enables a 'burrow density' to be calculated.

Of note is the burrow density recorded at the Activity Site, which varied from 0.02 burrows/m^2 to 0.09 burrows/m^2. The variability did not, in the professional opinion of VDC, warrant the splitting of the impact areas in terms of the assessment of impact. If anything, the treatment of the entities as a single impact site, for the offset calculation, over-estimates rather than under-estimates the impact to CNBC burrows and habitat.

Population size estimates have previously been calculated for burrowing crayfish species using burrow density estimates of 0.55/m^2 for undisturbed habitat and 0.05/m^2 for disturbed habitat. These density estimates are based on work for other burrowing crayfish species in Tasmania (Nelson 2003).

Risk of loss (%)

The risk of loss is a percentage figure that describes the chance that the habitat on the Offset Sites will be completely lost (i.e., no longer hold any value for the protected matter) over the foreseeable future (either the life of the offset or 20 years, whichever is shorter). Degradation to the quality of a site due to current

management practises has not be incorporated into the risk of loss, as these factors have been incorporated in the quality score.

The parameter has two components which are described below.

Risk of loss with Offset

The risk of loss for the Offset Sites has been assigned a score of 5% based on interpretation of the *Offsets Assessment Guide.* The low risk of loss is reflective of the Offset Sites remaining in the ownership and management control of the Latrobe Council. There is an inherent risk of habitat loss be it complete or partial or temporary or permanent from unknown, unforeseen stochastic events, accidents or acts of vandalism or malice. In this case, and for example, the primary risks are interference to the Offset Sites by the public, prolonged drought, major flood (a risk mitigated by the Activity itself), wildfire, and landslide. These risks and others are described and explored in section **E.6 Risks assessment and adaptive management**.

Risk of loss without Offset

There is no risk of loss for the River Road Offset Site as CNBC are not there now; something cannot be lost if it does not exist. For the Kings Park Offset Site it is possible to likely the CNBC present would be lost without the intervention works provided through the OMMP. The assessment of risk of loss without the Offset (70%) is based on the characteristics of the Kings Park existing burrows and habitat – i.e., the very small area inhabited by Engaeus, the low number of burrows present, the onion weed spreading in the area (for which there is currently no obligation for anyone to control to protect the species habitat present), and stochastic risk of drought, rubbish dumping, topsoil/earth-based material dumping etc. These risks will be prevented, or their likelihood of occurrence reduced to very low to negligible levels – see also section **E.6 Risks assessment and adaptive management.**

<u>Confidence in result (%)</u>

The confidence in result is a percentage figure that describes the level of certainty about offset success. Offset actions with a lower risk of failure would have a higher confidence in result score. For the area of community and area of habitat attributes, there are two components to which confidence in result relates: change in habitat quality and averted loss.

For the change in habitat quality component, the confidence in result captures the level of certainty about the successful achievement of the proposed change in quality. This includes the degree to which the proposed offset actions can be achieved and how likely they are to provide a benefit to the protected matter. For the averted loss component, confidence in result captures the level of certainty about the strength and effectiveness of the proposed risk-mitigation measures and the capacity of these measures to mitigate the risk of loss of the site.

The parameter has two components which are described below.

Change in habitat quality

A change in habitat quality from 4 to 8 out of 10 is proposed for the Offset Sites. The component of 'quality' to be enhanced is *species stocking rate*. That is, the number and density of burrows per square meter is to be increased by 4 points using the density categories listed in **Table 18 of the PD**.

Based on the Clayton Reserve offset in the Devonport City Council Municipality habitat was created and enhanced for CNBC. Additional habitat was also successfully created when CNBC were translocated to Clayton Reserve from the Squibbs Road Drainage Project at Spreyton. Both projects were successful in achieving the required offset – habitat creation where CNBC could colonise and persist, and a high survivorship of translocated animals. Van Diemen Consulting Pty Ltd will assist with the establishment of the Offset Sites as they did for the Clayton Reserve offset habitat areas for the Sheffield and Squibbs Road projects.

There is high confidence that the establishment of the Offset Sites for the Latrobe Levee project will be equally successful based on the application of the same principles of habitat creation and management. The Offset Sites will be further enhanced by the salvage and translocation of CNBC from the Activity site.

The 3 driving ecological requirements for *Engaeus granulatus* are –

- the presence of a suitable burrowing medium (e.g., fine clays, mudstone derived soils, alluvium, basalt clay-loams etc.),
- adequate water quantity, quality, and longevity of an accessible water table to facilitate colonisation and site persistence during dry periods, and
- some vegetative/organic input as a food source and shelter.

The OMMP describes management actions and the process to establish habitat for CNBC to colonise and persist within the Offset Sites. The actions and processes are based on previous experience with the Clayton Reserve and include for example –

- choosing an area with suitable soils, topography, and the ability to modify existing drainage patterns,
- earthworks to direct water, and to contain water in areas to create the damp, wet to boggy conditions suitable for colonisation of CNBC, and the
- the planting of sedge, rush, grass, and some tree species to create vegetative cover and a source of future leaf litter and organic material to the soil and soil surface.

On the above information a confidence score of 90% has been ascribed to this parameter in the EPBC offset calculator.

Averted loss

As noted for the Risk of loss (%) attribute, there is an inherent risk of habitat loss be it complete or partial or temporary or permanent from unknown, unforeseen stochastic events, accidents or acts of vandalism or malice. In this case, and for example, the primary risks are interference to the Offset Sites by the public, prolonged drought, major flood (a risk mitigated by the Activity itself), wildfire, and landslide. These risks and others are described and explored in section **E.6 Risks assessment and adaptive management**.

Table 6. Habitat 'Quality' scores for Central north burrowing crayfish at the Activity Site and Offset Sites

Quality Component	Impact Areas in Activity Site	Offset Sites
Site condition	Sites are drains associated with roadsides or agricultural channels. Native vegetation is absent. Vegetative cover is variable and formed by exotic species (grasses, herbs, sedges, and non-woody agricultural weeds). A score of 2 out of 3 is allocated.	Sites are agricultural (River Road) and recreational (Kings Park) lands. Vegetation is of variable cover formed by exotic species (grasses, herbs, sedges, and non-woody agricultural weeds). Some native semi-aquatic species are present (River Road). A score of 2 out of 3 is allocated.
Site context	Geographic location of a site does not seem to be a primary or driving factor in the presence of this species. The sites were treated equally in terms of their context as they are all connected to habitat occupied by the CNBC. A score of 1 out of 1 is allocated.	Geographic location of a site does not seem to be a primary or driving factor in the presence of this species. The sites were treated equally in terms of their context as they are all connected to habitat occupied by the CNBC. A score of 1 out of 1 is allocated.
Species stocking rate	Population size estimates have previously been calculated for burrowing crayfish species using burrow density estimates of 0.55/m^2 for undisturbed habitat and 0.05/m^2 for disturbed habitat (Nelson 2003). For the Activity Site, burrow densities were observed at the three impact locations – • River Road – 0.09/m^2 • Kings Park – 0.04/m^2	CNBC are absent in the River Road Offset Site. This does not reflect the prospective suitability of the habitat present to be able to support CNBC, rather it is likely a direct consequence of the site's current management arrangements (i.e., periodically stocked with horses and other livestock). CNBC are present in a very small area of the Kings Park (16 burrows). Burrows were well developed with 6 of the 16 (37.5%) being active (based on recently moved soil at the chimney) and there were only large burrows (no burrows in the <15mm width class) present.

	• Victor Street – 0.02/m^2 The presence of the species is the critical factor in determining the overall quality of habitat present, and whether the CNBC is <u>persisting</u> in that location. There is a high variability in density for disturbed sites (although this is clearly related to the **extent** of suitable/potential habitat used for the burrow density calculation). While the Activity Site has an average burrow density comparable to Nelson's (2003) 0.05/m^2 for 'disturbed habitat', the 'species stocking rate' concept also includes 'consideration of the role of the site population regarding the overall species population viability or community extent.'. For the River Road and Kings Park sites the burrows were well developed with >80% being active (based on recently moved soil at the chimney) and there were different sized burrows present (indicative of recruitment and prolonged occupation of the habitat by the species). A score of 5 out of 6 is allocated given the presence of the species, and the observation of different size classes of burrows which suggests continual recruitment and a prolonged occupation of the site by the species – the importance of the site for the species should be reflected in the offset required.	The sites under their current management arrangements are either not conducive to occupation by CNBC (River Road) or if CNBC is present (Kings Park) there appear to be limitations to the natural life history features expected to be present. A score of 1 out of 6 is allocated.
TOTAL QUALITY SCORE	**8 out of 10**	**4 out of 10**

PART C – ESTABLISHING THE OFFSET SITES

This section describes how the Offset Sites will be established, the salvage and translocation of the CNBC, the management of Contractors, and installation of environmental controls. This section must be read in conjunction with the Preliminary Documentation and OP.

C.1 Project Management and Construction Team

Given the complexity of the Project, there is a team of organisations and individuals involved.

C.1.1 Latrobe Council

The Latrobe Council as the Project LC is responsible for Project implementation and management in accordance with the Preliminary Documentation and associated plans. LC is also responsible for the necessary permits to be in place for Contractors to lawfully perform the tasks and duties of the works. The Project is overseen by the Superintendent with input from the Superintendent' representative, other LC staff, and suitably qualified external contractors.

C.1.2 Principal Contractor

BridgePro Engineering Pty Ltd is the Principal Contractor for project management services. The Principal Contractor is to apply sound environmental management practices during the Project which includes the construction-relevant aspects of the OMMP.

C.1.3 Environmental assistance and advice

Van Diemen Consulting Pty Ltd has been engaged to provide on-site assistance with the establishment of the Offset Sites and the salvage and translocation of CNBC.

C.2 Marking Out and boundaries

All marking out in the CNBC Impact Areas and Offset Sites must be completed before any construction related activities at these areas.

C.2.1 CNBC Impact Areas

A suitably qualified ecologist is to mark with flagging tape or survey marker paint the boundary of the CNBC Impact Areas (there are three locations – River Road, Kings Park and Sammy's Creek, see also **Table 1**) which are to be excavated to salvage CNBC.

C.2.2 Central north burrowing crayfish sensitive locations

Areas of existing crayfish burrows and habitat **adjacent** to the CNBC Impact Areas are to be identified on the ground in conjunction with a suitably qualified ecologist.

Temporary fencing or other suitable markers will be installed to identify machinery/disturbance exclusion zones. Existing crayfish burrows in the Offset Sites (only relevant to Kings Park) will be identified in the field by a suitably qualified person and visually identified with semi-permanent stakes with bright coloured paint. Their location will be shown to Contractors and others working in the Offset Site.

C.2.3 Other areas

Other OMMP relevant areas to be appropriately marked out include the following –

- ✓ Location of the Translocation Area within each Offset Site (see OP, **Attachment 2**) where CNBC are to be translocated,
- ✓ Location of where sediment control measures need to be installed at the CNBC Impact Areas prior to excavation works, and the
- ✓ Soil stockpile areas to accommodate material excavated during the salvage process.

C.3 Training and Inductions

The LC, or their representative, is responsible for implementing the environmental control measures for the Project, and permit conditions and requirements imposed by permits to implement the OMMP.

C.3.1 Inductions and CNBC Awareness

Environmental issues related to the OMMP will be addressed in induction sessions. Potential environmental impacts and their respective control measures for the Project will be discussed, explained and communicated to attendees. All full-time staff and contractors are required to attend an induction session.

The induction process for staff and contractors operating machinery, equipment and supplying earth-based products must provide a clear understanding of the extent of the areas approved for use and the way vegetation, soil, and overburden are to be managed and handled. The induction sessions may be modified according to the level of employee attending the induction session, so that all employees gain an appropriate level of understanding of environmental issues.

A CNBC specific component will be conducted by suitably qualified ecologists for those staff managing/overseeing the Project, and for staff and contractors operating machinery and equipment at the CNBC Impact Areas. The session will provide information on the conservation significance of the CNBC, its habitat, burrow identification, and the goals and statutory requirements of the Project to meet its commitment to mitigating and offsetting the impact to the species.

The inductions will be recorded, and attendees formally acknowledging attendance by completing/signing the induction attendance form.

A daily tool-box session, now a standard construction site operational procedure, will be conducted. The tool-box sessions will be recorded and filed as part of the Contractor's QSE Manager. Any changes to the way areas are marked in the field must be communicated to staff and contractors during a toolbox meeting or 'refresher' induction process.

C.3.2 Access to documents and plans

IFC drawings and plans, permits (i.e., Division 3 Dam Permit, permit to take threatened species) and associated management plans, will be stored at the site office.

C.3.3 Audits and Refresher Inductions

Environmental audits by the QSE Manager will be conducted fortnightly. A project specific audit proforma will be developed for this purpose. The findings of the audits will enable the review of work procedures and improvement of those systems to minimise repeat breaches.

C.4 Weather induced cessation of work or specific work activities

High winds can disperse dust whenever dry and friable materials are being handled by plant such as excavating, loading trucks, or trucks tipping. If significant dust is leaving the works area, it may be necessary to cease this type of work until the wind eases.

Heavy and/or sustained periods of rainfall can mobilise sediments during earth moving activities. If works are generating significant quantities of silt, it may be necessary to cease this work until rainfall eases. It will be important to not have large areas under construction to ensure that peak rainfall events, when they occur during the construction period, do not cause sediment loads to enter the drainage network below the Project Area.

C.5 Environmental Protection and Management Guidelines

Best practice management is important to the Latrobe Council to achieve sound environmental outcomes.

Environmental Protection Guidelines (EPGs) have been developed to address specific management prescriptions in addition to the general requirements applicable to the project indicated in the previous section.

The following Environmental Protection Guidelines are included in **Attachment 2** –

- **EPG 1:** Disturbance to Terrestrial and Aquatic Flora and Fauna
- **EPG 2**: Erosion, Sedimentation and Surface Run-off
- **EPG 3**: Weed and Pathogen Control

C.6 Construction Hygiene Measures

C.6.1 Materials

Rock used at the Offset Sites will be accessed from a root-rot free quarry and be washed with potable water to remove dirt and mud.

C.6.2 Machinery and equipment

Vehicles, machinery, and equipment involved in direct excavation and construction activities at either the Offset or CNBC Impact Areas will be washed prior to entering the site. The washing down of vehicles, machinery and equipment will occur in an appropriate location, such as a hardstand associated with a works area or commercial/industrial wash bay.

Hand tools, gumboots, holding containers and other equipment used to excavate CNBC must first be thoroughly washed in a solution of F10 disinfectant.

C.7 Plantings

C.7.1 Species selection and sourcing tubestock

Recommended plant species for each Offset Site are provided in section C. The species used will depend on the availability of tubestock and the weather/soil conditions at the time the plantings are done. There may need to be several plantings staged over 12 months to gradually enhance the created habitat.

To minimise the risk of introducing pathogens and other soil-borne diseases to the site all plants used for the project will be accessed from a reputable supplier who has strict soil hygiene measures in place.

C.7.2 Planting and watering tubestock

Tubestock should be planted at a suitable time of the year (e.g., autumn to winter, and possibly early to mid-spring depending upon medium to long term rainfall forecasts) to enhance the likelihood of survival of the plants without the need for additional watering. Fertiliser and/or effluent are not to be used.

Supplementary watering may be required in the initial summer period. Town water will be used to water plantings via a tank and pump system on a truck/4WD or sprinkler system if the watering needs to occur for a longer period – a process of adaptive management. It is important that plantings are not over-watered as the plants can become reliant on the additional water being provided. Water should only be provided to tubestock to enable their survival, rather than growth, through a dry period. It is unlikely that tubestock will need any supplementary water once they have survived one summer period.

C.7.3 Protecting tubestock

Herbivory can be prevalent in areas of pasture. Plant species with a tree or shrub life form should be protected as far as practicable using a stake and tree guard. Fertiliser tablets should not be used as they promote lush new growth that is highly palatable to herbivores which may damage the growing plants.

It is important to be aware that on occasion, tree guards can attract wildlife to the tubestock which inevitably causes higher losses than if tree guards were not used. If there are high numbers of wallabies in the area, then some plants should be planted without a tree guard – instead they can be marked with a bamboo stick with a red/orange painted tip to enable identification of the planted tubestock.

If herbivory levels are very high and the tubestock are being heavily impacted, then advice and management recommendations will need to be sought on a case-by-case basis from a suitably qualified person.

C.8 Weed Management

Weed control and eradication works will be applied on an 'as required' basis following assessment of the site during each reporting period. Advice on the timing of weed control relative to native plant regeneration will be sought from a suitably qualified person.

The *'Rivercare – Guideline for the safe and effective herbicide use near water'* and 'The 'Keeping It Clean – A Tasmanian Field Hygiene Manual to prevent the spread of freshwater pests and pathogens' will be applied.

Key LC staff will be trained in weed identification and management measures.

C.9 Emergency Response Procedures

The following measures are to be adopted in the event of an emergency in addition to those measures that form part of the standard operating – work protocols of the civil contractor.

C.9.1 Fire

In the event of a fire (e.g., machinery, bushfire) always the contact emergency services on 000 (triple zero) without delay.

C.9.2 Minor Spill/Leak Control Measures

In the event of a hydrocarbon spillage or leak greater than 1 L volume but less than 10 L the spill kit (or kits) will be deployed as the means of clean-up. The spill kit (or kits) will be replenished as soon as possible, and the contaminated spill kit (or kits) will be disposed of by the Contractor at an authorised location to receive such waste material.

An **Incident Report** must be completed by the Contractor within 72 hrs of the incident occurring and provided to the LCC Superintendent by email or fax.

C.9.3 Event leading to or possibly leading to environmental harm

If an incident causing or threatening to cause environmental nuisance, serious environmental harm or material environmental harm from pollution occurs at the Development during construction works then use this procedure.

An environmental incident may include for example,

- the release of sediment, sudden or gradual, which may be from a sustained or heavy rainfall period or the failure of sediment control structures that causes the discolouration of surface flows; and/or
- spillage of large quantities of oil or fuel (>10L) from machinery that cannot be adequately managed using a standard spill kit.

If you think that the incident may unacceptably pollute the environment or cause harm to human health, then it should be reported.

In the event of an environmental incident the following procedure is to be applied by the civil contractor: -

1. Ensure that the safety of employees and the public is established and maintained if it is safe for you to do so.
2. Take all reasonable steps to prevent further pollution or environmental harm form occurring if it is safe to do so. This may include the pumping of fuel from a breached container into another or the bunding of a waterway to prevent spillage from extending further away from the spill location.
3. Contact the LC Superintendent, Principal Contractor or their delegated representative.
4. If none of the above are contactable or advice is not provided, then contact the Environment Protection Authority by telephoning 1800 005 171 (a 24-hour emergency telephone number) for advice.

You must provide details of the incident which could include the product name, estimated volume of the spill and possible effects of the spill on the surrounding environment (e.g., nearby creeks, downstream uses of the waterway).

C.9.4 Notification of any incident to the Latrobe Council

All environmental incidents must be notified to the LC Superintendent or their delegate as soon as possible, but within 24 hrs of the incident occurring. An **Incident Report** must be completed by the Contractor within 24 hrs of the incident occurring and provided to the LC Superintendent or their delegate by email or fax.

PART D – OFFSET SITE MANAGEMENT

The Offset Sites will be managed by the Latrobe Council, but suitably qualified persons or organisations may be engaged to assist with site management activities or to provide expert management advice. Assistance and advice will be sought on an ongoing basis.

D.1 Management constraints and measures to be applied at Offset Sites

Post-construction management constraints and measures to be applied at the Offset Sites are described in **Table 9**. The management arrangements will be identified through the Assets Register and implemented through Council's work program.

D.2 Management actions and timing at Offset Sites

The establishment and successful management of the Offset Sites is contingent on the implementation of key actions, some of which are unique to one of the sites only.

Table 10 provides a list of the management plan actions and timing for the installation and maintenance of the Offset Sites, excluding monitoring provisions which are identified in PART E – MONITORING AND ADAPTIVE MANAGEMENT. The primary action is to conduct earthworks to enhance and/or install drainage systems at the Offset Sites. Earthworks and plantings at the translocation areas in the Offset Sites must be completed prior to the translocation of salvaged CNBC.

Communication actions are listed for both the Offset Sites which relate to stakeholder management (including the Tasmanian Trail Association), adjoining landowners and the broader community. The dissemination of information to the broader community, and especially to those who may use or visit the Offset Sites, of the natural values present (principally the CNBC) and the management objectives of the site works is critical to achieving success.

D.3 Community awareness of the Offset Sites and CNBC

Information about the Offset Sites will be provided through the LC webpage, including a copy of the OMMP.

LC will also provide information to the community via newsletter articles and information in local newspapers and publications. LC organised field days may be conducted at Offset Sites with community groups, local residents, school groups or others interested in the conservation values in the Offset Sites and Project outcomes.

Comments and information from the public about the Offset Sites will be via the existing LC process of community feedback (i.e., email, mail, phone calls to the LC Main Office and/or elected members of Council).

Specific information such as interpretative signage will be provided at the Offset Sites relevant to that location.

D.4 Landowners adjoining the Offset Sites

LC will engage in discussion with adjoining landowners to the Offset Sites to advise and educate them of the conservation significance of the Offset Sites and general area. Where possible, verbal agreement between the LC and adjoining landowners will try to be reached over the adjoining land use activities to ensure that off-site activities do not impact on the site (e.g., changes to water use or flow on adjoining lands).

Table 7. Post-construction management constraints and measures to be applied at the Offset Sites

	OFFSET SITE	
LAND USE	**RIVER ROAD**	**KINGS PARK**
STOCK GRAZING	Livestock prohibited.	Livestock prohibited.
FUEL REDUCTION AND ECOLOGICAL BURNS	Fire is not a necessary management tool.	Fire is not a necessary management tool.
CAMPFIRE(S)	Not permitted.	Not permitted.
FIREBREAKS	Very unlikely to be required. Firebreaks must be approved by DAWE prior to installation.	Very unlikely to be required. Firebreaks must be approved by DAWE prior to installation.
HERBICIDES, PESTICIDES, FERTILISERS AND OTHER CHEMICALS	Herbicides may be used as part of a weed management program strictly in accordance with the manufacturer's specifications. No fertilisers or pesticides are to be applied.	Herbicides may be used as part of a weed management program strictly in accordance with the manufacturer's specifications. No fertilisers or pesticides are to be applied.
CONTROL OF EXOTIC PLANT SPECIES (WEEDS)	Annual inspections with the control and (if possible) eradication of Declared and environmental weeds to achieve the Completion Criteria.	Annual inspections with the control and (if possible) eradication of Declared and environmental weeds to achieve the Completion Criteria.
CONTROL OF EXOTIC (FERAL) ANIMAL SPECIES	No relevant, feral animals are unlikely to be a management issue.	No relevant, feral animals are unlikely to be a management issue.
CONTROL OF NATIVE ANIMALS	Not permitted.	Not permitted.
DOGS IN THE OFFSET SITE?	Dogs not permitted.	Dogs permitted if under effective control.

INTRODUCTION OF NATIVE FLORA FOR THE PURPOSE OF REVEGETATION	Permitted in accordance with the OMMP and subsequent advice/authorisations.	Permitted in accordance with the OMMP and subsequent advice/authorisations.
TAKING OF WATER FOR DOMESTIC USE	Not permitted.	Not permitted.
NATURAL FLOW OF WATER	Minor interference with the natural flow of water is permitted where it is associated with existing enhancing the habitat created for CNBC.	Minor interference with the natural flow of water is permitted where it is associated with existing enhancing the habitat created for CNBC.
EFFLUENT AND IRRIGATION	The use of irrigation water or effluent is prohibited.	The use of irrigation water or effluent is prohibited.
EXISTING VEHICLE OR FORMED WALKING TRACKS?	No.	No.
VEHICLE TRACKS	No carriageways are permitted.	No carriageways are permitted.
WALKING TRACKS	A walking path may be installed and maintained on higher ground at the southern end of the Offset Site for walkers to traverse the area without interference to the CNBC habitat.	Wooden footbridge sections may be installed at the northern side of the Offset Site (**Attachment 5**), adjacent to Kings Creek (on the high points in the Offset Site).
VEHICLE USE	Vehicle use only permitted for - • To assist with approved maintenance activities • To assist with weed control activities	Vehicle use only permitted for - • To assist with approved maintenance activities • To assist with weed control activities
OFF-ROAD VEHICLE USE	Not permitted.	Not permitted.
RECREATIONAL USE AND DELETERIOUS ACTIVITIES	Recreational activities that are not considered deleterious to the natural values are permitted on the land. No activities (including, but not confined to removal of natural resources, dumping of rubbish, general disturbance etc) which are or may be deleterious to the natural values are not permitted.	Recreational activities that are not considered deleterious to the natural values are permitted on the land. No activities (including, but not confined to removal of natural resources, dumping of rubbish, general disturbance etc) which are or may be deleterious to the natural values are not permitted.

CONSTRUCTION OF INFRASTRUCTURE (EXCLUDING FENCING)	LC may install and maintain mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation. No toilets or other effluent creating amenities will be constructed in the Offset Site. A walking path may be installed and maintained on higher ground at the southern end of the Offset Site for walkers to traverse the area without interference to the CNBC habitat.	LC may install and maintain mobile picnic tables and other infrastructure in the site (e.g., seats) where there will be nil impact to the natural values of the site subject to approval by DAWE prior to installation. Wooden footbridge sections may be installed at the northern side of the Offset Site (**Attachment 5**), adjacent to the Kings Creek (on the high points in the Offset Site) for walkers to traverse the area without interference to the CNBC habitat. No toilets or other effluent creating amenities will be constructed in the Offset Site.
INTRODUCTION OF FOREIGN MATERIALS	Introduction of foreign materials (e.g., gravel, rock, woody debris) is only permitted for the maintenance of infrastructure (tracks, etc.) or for remedial/enhancement works associated with the CNBC habitat.	Introduction of foreign materials (e.g., gravel, rock, woody debris) is only permitted for the maintenance of infrastructure (tracks, etc.) or for remedial/enhancement works associated with the CNBC habitat.
MONITORING	The installation of star pickets and associated monitoring plot infrastructure such as pegs, and tape is permitted. Transects markers and monitoring plots/quadrat markers may be installed as part of the monitoring program.	The installation of star pickets and associated monitoring plot infrastructure such as pegs, and tape is permitted. Transects markers and monitoring plots/quadrat markers may be installed as part of the monitoring program.

Table 8. Management plan actions and timing for the installation and maintenance of the Offset Sites

	RIVER ROAD		KINGS PARK	
ITEM	**Action**	**Timing**	**Action**	**Timing**
EARTHWORKS	Conduct earthworks to install low-lying areas for water ponding. Enhance drains directing water to wet areas.	At least 14 days before CNBC are translocated to the site	Conduct earthworks to install low-lying areas for water ponding. Install minor blockages to drains.	At least 14 days before CNBC are translocated to the site
PLANTINGS	Plant tubestock and protect from herbivory as required.	At least 7 days before CNBC are translocated to the site	Plant tubestock and protect from herbivory as required.	At least 7 days before CNBC are translocated to the site
FENCING	Install personal access gate into southern fence	Within 1 month of earthworks being completed	[redacted]	
	Establish horse-proof fencing on eastern perimeter of site to connect to existing fencing around western and southern perimeter.	Established prior to CNBC being translocated		
RETAINING WALL	[redacted]		Build retaining wall on southern boundary.	To be built before or concurrent to the earthworks for drainage improvements
SIGNAGE	Establish signage advising the public of the Project and the sensitivities of the Offset Site	At least 14 days before CNBC are translocated to the site	Establish signage to advise the public of the Project and the sensitivities of the Offset Site	At least 14 days before CNBC are translocated to the site

	Establish permanent interpretative signage	Within 2 months of CNBC being translocated	Establish permanent interpretative signage	Within 2 months of CNBC being translocated
WEED CONTROL	Control onion weed and other weeds	Initial weed control within 3 months of earthworks being completed and then ongoing as required	Control onion weed and other weeds	Initial weed control within 3 months of earthworks being completed and then ongoing as required
	Weed assessment survey for control works program	Every 12 months from CNBC being translocated	Weed assessment survey for control works program	Every 12 months from CNBC being translocated
	Implementation of weed control program	As guided by the weed assessment survey	Implementation of weed control program	As guided by the weed assessment survey
COMMUNICATIONS	Provide the OMMP on the LC webpage in addition to information about the Project and the importance of the Offset Sites to the success of the Project	At least 14 days before CNBC are translocated to the site	Provide the OMMP on the LC webpage in addition to information about the Project and the importance of the Offset Sites to the success of the Project	At least 14 days before CNBC are translocated to the site
	Advise the Tasmanian Trail Association of the change in land access and the area available for horse agistment		Liaise with adjacent landowners about the Project and the Offset Sites	
	Liaise with adjacent landowners about the Project and the Offset Sites			
	Advise the community of the Offset Site and its intended aims of protecting and preserving CNBC		Advise the community of the Offset Site and its intended aims of protecting and preserving CNBC	

PART E – MONITORING AND ADAPTIVE MANAGEMENT

E.1 Objectives

Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored (ecological based), and enforced.

The monitoring program is designed to: -

- Inform and report 'early-control', i.e., to demonstrate that management actions are effective in achieving interim performance targets, and therefore in time completion criteria; and
- Support an 'early warning' function, i.e., to inform timely decisions on corrective actions to ensure performance and completion criteria are achieved / maintained.

The objective of the monitoring program is to evaluate the progress of Offset Site management activities and inform successful and timely interventions. To achieve this goal, relevant data and information need to be gathered, collated, and interpreted as described below.

E.2 Suitably Qualified Persons

All ecological – biodiversity related monitoring actions will be carried out by a suitably qualified person, with the necessary scientific training and induction to access the Offset Sites.

A suitably qualified person(s) will have a relevant degree and enough experience that makes them competent to undertake field-based activities. For Offset Site monitoring, this includes qualified ecologists with relevant experience to carry out site assessments.

E.3 Data collection and handling

A data handling program will be implemented to ensure proper data storage and protection, data extraction, quality control, analysis, interpretation, reporting and presentation.

Key features of the data handling program will include:

- A standard template and structure for all reports;
- Standardised data collection methods by qualified personnel;
- Use of field assessment form tailored to capture relevant site data;
- Quality Assurance review process by informed individuals; and
- Consistent filing within the Latrobe Council's filing/database storage network.

Data will be sent to DAWE on an annual basis via electronic means, e.g., email or via data sharing software. DAWE is authorised by the LC to receive, distribute, and utilise data collected from the OMMP implementation to formulate and implement compliance audits and recovery planning purposes.

E.4 Completion Criteria

It is important that the success or otherwise of the project be assessed against key criteria. These are:

- Less than 5% projected foliage coverage of Declared Weeds or Weeds of National Significance present in or adjacent to the habitat created for CNBC,
- At least 2,050 m^2 of created habitat (potential or actual), and
- No moderately to highly erosive surfaces present in the created habitat (indicated by areas of recent sediment accumulation, or sediment removal).

E.5 Monitoring progress towards completion

A suitably qualified ecologist will conduct the assessment of burrow number and density in the Offset Sites where habitat was created for CNBC.

Table 11 provides the parameters and frequency of monitoring for both Offset Sites.

Data for each of the attributes monitored will be collected to quantify habitat improvement from baseline conditions. This will enable any change in attributes measured to be identified, thus enabling a comparison to previous years' data and progress towards attainment of the habitat improvements/maintenance identified in the EPBC Offset Assessment Guide Calculator inputs.

E.5.1 Burrow Counts

Monitoring of the translocated CNBC will continue for 6 months from the date of translocation – at 2, 6, 12, and 26 weeks from translocation.

Beyond 12 months there is no certainty that the animals being monitored are those that were actually translocated as CNBC dig underground and can build entrances additional to their primary burrow entrance. CNBC may also migrate away from the initial site of translocation but remain alive, contributing to the population CNBC present.

The assumptions used to estimate the number of CNBC in the CNBC Impact Sites will be applied at the Offset Sites; the number of burrows will be counted (if the area is large then the sub-samples may be collected using quadrats across the area; advice from an ecologist will be sought in this case) and number of animals estimated based on a 50% occupation rate of the total number of burrows. This approach makes the assessment of impact and offset directly comparable in terms of number of estimated animals present.

E.5.2 Plantings

A visual assessment will be made of the number of plant losses for each species that has been planted. Records of losses will be kept including the species and the likely reason for loss (e.g., drought, insect attack).

E.5.3 Auger to water table and surface flows

An auger will be used to determine the depth of the water table. A visual assessment will be made of surface flow direction and intensity and notes made of any erosive or potentially erosive surfaces.

E.5.4 Photopoints

Prior to the commencement of works at each Offset Site, photopoint locations will be established by a suitably qualified person to ensure accurate photographic records of the works and improvements at the site are made.

Guidelines are provided in **Attachment 3** to describe how to setup and record photopoint locations.

Photos will be taken at each photopoint when an assessment of Project completion has been made.

E.5.5 Physical Site - Management Measures

In addition to ecological characteristics, the incidence and extent of significant weed incursions/occurrences, presence of pest animals and other deleterious impacts (e.g., unauthorised clearing, installation of tracks and drains) in each Offset Area will be recorded through transect/plot or time meander surveys.

Other impacts and/or land management activities (e.g., unlawful access to an area by off-road vehicle users) will be recorded by the LC or their representative conducting the monitoring. The observations made may initiate a monitoring event to determine if there has been an impact and its magnitude. Remedial works may be required.

Table 9. Monitoring parameter and frequency for Offset Sites for the Latrobe Levee Project

Parameter	Tasks	Frequency	Qualification to conduct task
Salvage and translocation			
Survivorship of salvaged and translocated CNBC	Burrow Count Photopoints	2, 6, 12, and 26 weeks from translocation (6 months)	Suitably qualified ecologist
Habitat Creation and Improvement			
Burrow increase	Burrow Count Photopoints	6, 12, 36 and 52 weeks then once every 12 months. Frequency of monitoring reviewed at year 3.	Suitably qualified ecologist
Erosion	Photopoints	6, 12, 36 and 52 weeks then once every 12 months. Frequency of monitoring reviewed at year 3.	Suitably qualified ecologist
Wetness	Observation of surface flows Auger to water table	6, 12, 36 and 52 weeks then once every 12 months. Frequency of monitoring reviewed at year 3.	Suitably qualified ecologist
Plantings	Count losses Observations of recruitment Photopoints	Every 6 months from planting for 10 years. Frequency of monitoring reviewed at year 3.	Suitably qualified person and/or LC representative

E.6 Risks assessment and adaptive management

Any land management program must consider the impacts of unplanned/stochastic events. This section reviews the impact of possible deleterious events and impacts via a risk-based approach in terms of the consequence category - environment.

E.6.1 Assessment of Risk

The key risks associated with biodiversity and land management have been assessed using the likelihood ratings, maximum reasonable consequence ratings, risk matrix and classifications listed in **Tables 12 and 13**.

Table 10. Likelihood – Consequence Matrix Outcomes

		Consequence				
		Minor	Moderate	High	Major	Critical
Likelihood	Highly Likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

E.6.2 Identification of Risks

Table 13 outlines the key identified risks and feasible correction actions for these risks associated with failure of the Offset Areas to achieve completion criteria related to habitat quality. The ratings assume that the risks are untreated i.e., have not been addressed by specific risk mitigation measures other than routine design and operational practice.

All risks are considered manageable and actions within sections of this OMMP address the relevant risks.

Table 11. Risk assessment for all Offset Sites

Management objectives/desired outcome	Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RR		
To maintain long-term security of the Offset Sites for conservation	Latrobe Council sells land that supports one or both Offset Sites	Offset Sites are maintained as assets of the Latrobe Council Maintain sites in Asset Register acknowledging the sites association with EPBC 2020/8846 Maintain *Open Space* zoning	Rare	Critical	**High**	Request from the public/developer to buy the land Disposal of public land process initiated by Council	Due diligence identifies the Offset Sites are to be held in public ownership due to EPBC2020/8846.
	Landowner adjoining Offset Site changes	Liaise with new landowner to reiterate the values of the adjoining the Offset Site	Likely	Minor	**Low**	Monitor land title (rates notice) information for any changes in landowners	Regular provision of information to adjacent landowners which may include a newsletter or letter directing people to the annual report on the LC webpage.
To achieve performance targets and completion criteria for all MNES	Latrobe Council inadequately applies or constrains land management practices which may lead to the deterioration of created habitat	LC to enforce land management constraints to achieve desired outcomes	Unlikely	High	**Medium**	Monitoring, audits and/or annual reporting Direct contact with the adjoining landowner and/or manager	Latrobe Council to apply adaptive management to ensure that the objectives of the OMMP are not compromised
	Insufficient funds provided by the Latrobe Council to implement the OMMP	Latrobe Council identifies budget for immediate and long-term activities required by the OMMP	Rare	High	**Low**	Failure to implement required monitoring activities and reporting	Latrobe Council identifies activities in annual budgets and allocates funds to meet OMMP requirements

		Engage a consultant to conduct the monitoring works and reporting					
	Stochastic events (wildfire, drought) prejudice attainment of interim performance targets and/or completion criteria for MNES	Plan for potentially delayed completion; revise management regime to reflect changed conditions.	Possible	Moderate to High	**Medium**	Monitoring, audits and/or annual reporting	Apply adaptive management to ensure that the objectives of the OMMP are applied and not compromised Review OMMP to reflect changed conditions
	Vandalism to the Offset Sites	Signage to advise of the importance of the sites to the community and the construction of the flood levee Communications within the community	Possible	Moderate to High	**Medium**	Monitoring, audits and/or annual reporting Works/maintenance activities such as fence checking and repair (River Road), weed control, additional plantings, checking signage or installing new or additional signage Complaints from the public	Increased signage Additional or new fencing Increased communications in the community Field day/public day Greater involvement of community groups with site management
	Damage to CNBC burrows or their habitat from the public accessing the Offset Sites	Signage to advise of the importance of the sites to the community and the construction of the flood levee Communications within the community Bollard installation at Kings Park which may be in the form of large boulders	Possible	Medium	**Medium**	Monitoring, audits and/or annual reporting Works/maintenance activities such as fence checking and repair (River Road), weed control, additional plantings, checking signage or installing new or additional signage Complaints from the public	Increased signage Additional or new fencing Increased communications in the community Field day/public day Greater involvement of community groups with site management especially schools

	Hydrological change within or external to the Offset Sites	Surface water diverted away, in part or in full, from Offset Site Changes to hydrological function in the Offset Site (blockage of drain, breakthrough in drain)	Possible	Moderate to High	**Medium**	Stormwater planning to consider Offset Sites and associated water inputs Monitoring, audits and/or annual reporting	Plan to not change hydrological function of the source water inputs Offset Sites must be considered in relation to any stormwater planning or upgrades in the immediate area that may affect water inputs
	Unauthorised entry of domestic stock to the Offset Sites (River Road)	Ensure appropriate fences are established and maintained. Signage is to be erected to advise that horses are not permitted in the Offset Site	Rare	High	**Low**	Monitoring, audits and/or annual reporting	Install additional signage. Repair fence if it is damaged.

E.7 Adaptive Management

Adaptively implementing the OMMP is critical to achieving its objectives.

The LC will adaptively implement this OMMP by considering and evaluating the learnings from implementing the OMMP, mitigating any uncertainty associated with OMMP implementation, and to change management arrangements if the applied measures are not delivering improvements to site habitat condition.

The adaptive management cycle is based on core adaptive management principles, outlined in the diagram below.



To maintain an adaptive approach, the LC will: -

- Collect and incorporate new data / information as a result of implementing the plan, with new findings from data collected or from new information derived from external sources,
- Effectively schedule monitoring of the Offset Sites to make informed decisions on site management, and remedial works,
- Commit to periodically reviewing risks, including those in response to the changing risk level, new information, changing circumstances or the results from implementing corrective actions, as per Part G,
- On a regular basis, review the effectiveness of those management measures that have a significant level of uncertainty and relatively long implementation timeframes,
- Identify and address the causes and/or consequences of significant environmental incidents are addressed, and
- Review the OMMP as soon as possible when there are indications of OMMP failure/s.

E.8 Remedial works

A suitably qualified ecologist will provide advice on the remedial works that may be required (e.g., improved sediment control measures, further movement of soil to improve water soakage into or through the site).

E.8.1 Drainage alterations or enhancement

Remedial works may be needed in the short-term to ensure that an optimal level of water flow and soakage is occurring in created habitat areas of the Offset Sites. Further or additional sediment control measures may be needed in the short-term to stabilise soil surfaces and enhance the soil binding role of plantings.

Remedial actions may include for example: -

- Further scalping or excavation of the soil surface to deepen areas to promote further water accumulation and/or prolong water lie.
- Additional or enhanced blockages to surface water outflows to cause water to pool more and/or for longer. This may include increasing their height or to make them more robust.
- Additional and/or replacement of erosion control matting, mesh or sediment netting and fences.
- Use of rocks, coarse gravel or coarse sands to protect drains from scouring.

E.8.2 Additional plantings

A visual assessment will be made of the number of plant losses for each species planted and of the natural regeneration (seed, rootstock) that occurs over time. Additional plantings can compensate for those losses identified during inspections of the Offset Sites.

The species planted should be those listed in **Tables 4 and 5** for the River Road and Kings Park Offset Sites respectively unless otherwise advised by a suitably qualified ecologist.

E.9 Monitoring indirect impacts to CNBC habitat

E.9.1 Possible Indirect Impacts

It is unlikely that there will be any undesirable or unanticipated impacts (during construction and post-construction) to areas downstream of the work sites for the Project. Risks such as sediment release into the water column can be avoided and managed by the application of standard construction site sediment/erosion control measures. Monitoring for impacts downstream will be via *EPG 1: Disturbance to Terrestrial and Aquatic Flora and Fauna* and *EPG 2: Erosion, Sedimentation and Surface Run-off* (Attachment 1).

The OMMP provides information about monitoring selected areas to assess post-construction indirect impacts to CNBC areas downstream of the work areas.

E.9.2 Locations of potential indirect impacts

The following comments, notes and images are provided for each of the three **indirect impact** areas (**Figure 5**) that are to be monitored.

<u>Sammy's Creek</u>

The full extent of Sammy's Creek from the impact area through to the Mersey River is suitable habitat for CNBC. Burrows were observed in a few sections of the creek system, but an exhaustive survey was not

undertaken by VDC because it is outside the direct impact area. The increased water flow and/or frequency of peak flow into the new culvert are unlikely to cause any impact to the habitat present however the monitoring of habitat quality and burrows in selected locations along the creek should be conducted to demonstrate that no net impact has occurred.

River Road into Bells Parade

The drain from River Road flows north-westwards into Bells Parade where it terminates in a culvert/pipe which drains to the Mersey River. Burrows are prolific in the drain, especially on a steep embankment adjacent to the *Melaleuca ericifolia* swamp forest remnant and near the terminal culvert/pipe of the drain. The images below show the typical features and habitat form in the drain that flows from River Road (the works area) into Bells Parade.

The water flow and/or frequency of peak flow into the upgraded culvert system is unlikely to change so the works are unlikely to cause any significant indirect impact to the habitat present. Monitoring of habitat quality and burrows in the drain will be conducted to demonstrate that no net impact has occurred.



Walking track over bridge across drain



Drain looking north-westwards with *Melaleuca ericifolia* swamp forest remnant on right (arrow)





Embankment of drain adjacent to the *Melaleuca ericifolia* swamp forest remnant



Drain looking south-eastwards towards terminal culvert/pipe (arrow)



Terminal drain culvert/pipe looking south-eastwards

Kings Creek

The full extent of Kings Creek from the impact area through to the Mersey River is suitable habitat for CNBC. Burrows were observed in a few sections of the creek system, with a survey of the creek system having been done by Entura (2021).

Kings Creek is a highly modified creek system from Kings Park downstream to the Mersey River. Some sections are piped as they occur under streets and car parks associated with the Latrobe township. Where it is not piped or bounded by hard infrastructure (i.e., retaining walls) it is dominated by weeds and pasture grasses and herbs with occasional remnant native trees such as blackwood (*Acacia melanoxylon*) and silver wattle (*A. dealbata*). Introduced deciduous trees and 'garden escape' woody and non-woody weeds are locally dominant.

While there is the possibility of an indirect impact to the habitat from sediment released by the proposed works, these risks can be managed by standard construction site sediment/erosion control measures.

The increased water flow and/or frequency of peak flow into the new culvert are unlikely to cause any impact to CNBC habitat present however the monitoring of habitat quality and burrows in selected locations along the creek should be conducted to demonstrate that no net impact has occurred.

The images below show the typical features and habitat along Kings Creek downstream of Kings Park.



Kings Creek flowing near Gilbert Street



Kings Creek passing under bridge on Victor Street



Kings Creek flowing behind houses on Gilbert Street



Kings Creek with Kings Park in background

E.9.3 Locations of potential indirect impacts

A suitably qualified ecologist will conduct the assessment of burrow number and density in the Offset Sites where habitat was created for CNBC.

E.5.1 Burrow Counts

Monitoring of the translocated CNBC will continue for 6 months from the date of translocation – at 2, 6, 12, and 26 weeks from translocation.

Beyond 12 months there is no certainty that the animals being monitored are those that were actually translocated as CNBC dig underground and can build entrances additional to their primary burrow entrance. CNBC may also migrate away from the initial site of translocation but remain alive, contributing to the population CNBC present.

The assumptions used to estimate the number of CNBC in the CNBC Impact Sites will be applied at the Offset Sites; the number of burrows will be counted (if the area is large then the sub-samples may be collected using

quadrats across the area; advice from an ecologist will be sought in this case) and number of animals estimated based on a 50% occupation rate of the total number of burrows. This approach makes the assessment of impact and offset directly comparable in terms of number of estimated animals present.

E.5.4 Photopoints

Prior to the commencement of works at each Offset Site, photopoint locations will be established by a suitably qualified person to ensure accurate photographic records of the works and improvements at the site are made.

Guidelines are provided in Attachment 3 to describe how to setup and record photopoint locations.

Photos will be taken at each photopoint when an assessment of Project completion has been made.

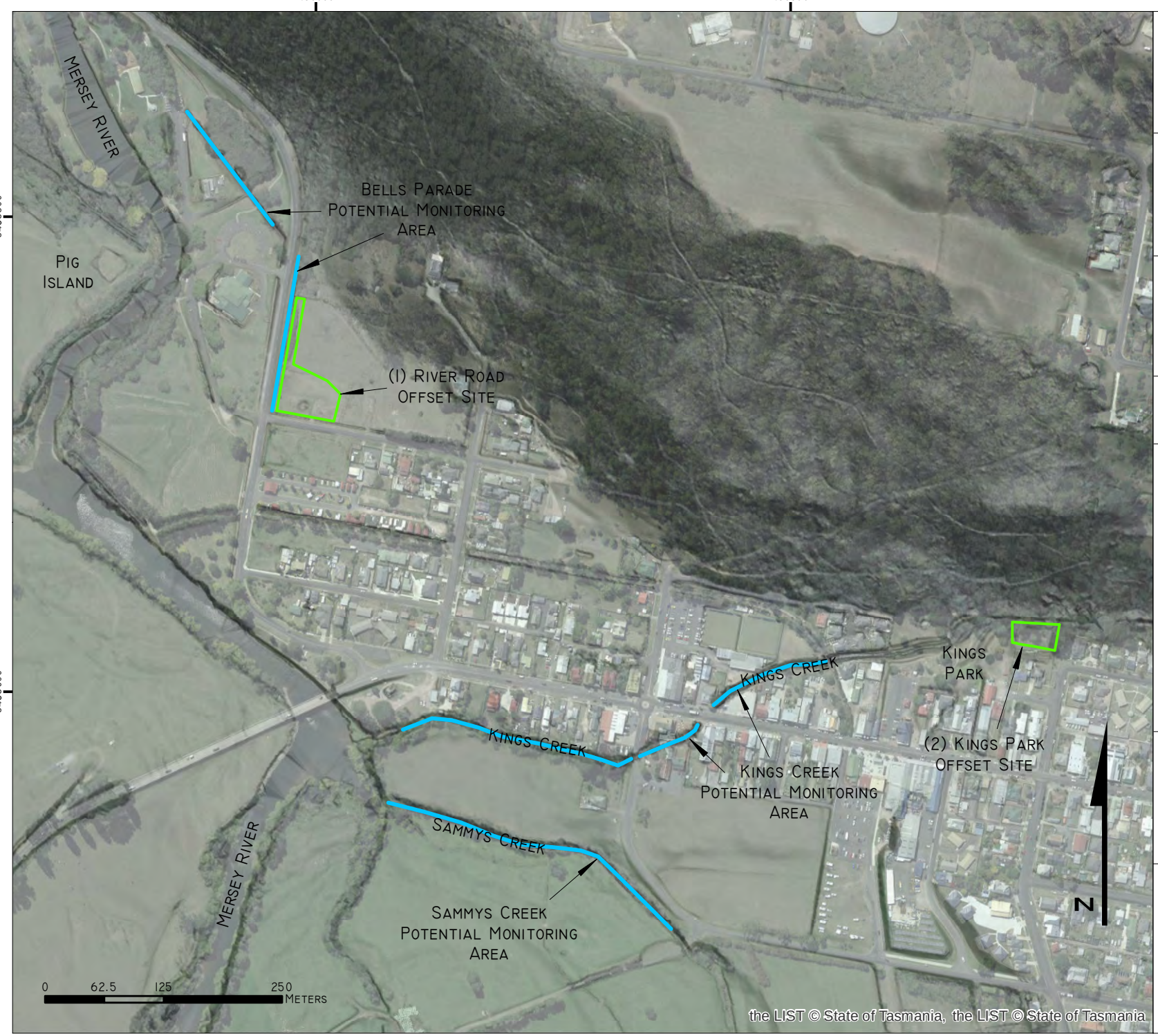
E.9.2 Monitoring to detect indirect impacts

Photopoints and burrow counts will be conducted at selected locations in each of the three indirect impact areas shown in **Figure 5**. The locations will be selected by a suitably qualified ecologist.

Attachment 6 provides details of the monitoring methods to be applied, the data to be collected and guidance on the review of collected data to determine trends in cause/effect.

E.9.4 Detection of indirect impacts

Indirect impacts will be quantified over time from baseline data (collected when the Offset Sites are established) and reported in the Annual Report. Additional offset measures may need to be applied if indirect impacts occur, subject to their spatial extent and likely longevity.



LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 5: INDIRECT IMPACT MONITORING LOCATIONS FOR CNBC BURROWS AND HABITAT

TASMAP:	LGA:
LATROBE	LATROBE

BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA

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DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT:
BRIDGE PRO
PTY LTD AND
LATROBE COUNCIL

DATE: 28 NOV 2021

PART F – REPORTING

The Latrobe Council is responsible for all reporting, monitoring and reviews of the OMMP but may engage suitably qualified persons or organisations to assist with this process.

F.1 Offset Site Construction Phase Records

F.1.1 Environmental Protection Guidelines

The Environmental Protection Guidelines (**Attachment 1**) specify environmental management measures in addition to the general requirements applicable to the Project. The EPG's include requirements for the collection of data/records related to the implementation of the EPG's.

F.1.2 CNBC Salvage and Translocation Procedure

The data that need to be collected during the CNBC salvage and translocation process are described in **Attachment 2.**

F.2 Annual Report

Unless otherwise advised by DAWE or imposed by the permit conditions of the approval, LC will: -

1. submit a report annually to DAWE for the duration of this OMP,
2. submit the report at least two months prior to the anniversary date of the approval of the OMMP to allow time for compliance to be assessed before the anniversary date.
3. Publish reports on the LC website within 3 months of every 12-month anniversary.

The Annual Report will address progress against the commitments set out in this OMP. Annual Reports will provide enough detail in the form of written comments and supporting evidence that an assessor can easily determine the completion of/progress against the management commitments and completion criteria for the Offset Sites.

The annual report will include:

- Details of management actions, including on ground works, undertaken within the Reporting Period.
- Results of monitoring activities, including fence condition (where relevant), weeds, habitat quality, vegetation quality.
- Tracking and evaluation of results in comparison to management performance targets and completion criteria.
- Site photographs including those from photo point locations.
- Details of compliance or non-compliance with the schedule of management actions (Table 4).
- Details of compliance or non-compliance with performance targets (Section 3.4.2).
- Details of any incidents or new and emerging management issues, with recommendations for corrective action and plan review in order to attain the offset completion criteria.
- Any triggers exceeded, and which corrective actions were implemented

- Details of any GSM monitoring events including an assessment of the relevant results.

The reporting schedule is detailed in Table 7.

F.3 Review of OMMP

This plan includes an adaptive management approach, where corrective actions may be triggered by events occurring within the Offset Sites, or the results of monitoring activities. A review of the OMP will only be necessary in the event of a major incident that makes a significant change to the character or condition of the offset area. The most likely such event is a major flood event, as described in **Table 5**.

If a plan review is triggered, this will be conducted by LC in consultation with DAWE. Revisions of the OMMP will not be implemented until approval of the change has been given by DAWE. Any future adaptive management changes will be incorporated into the OMMP and an updated version of the OMMP will be supplied to DAWE for approval.

The OMMP review may involve changes to any part of the OMMP, to adequately respond to the trigger and re-direct management actions towards achieving the offset completion criteria under potentially altered site conditions.

This could involve changes to:

- Specific details of offset site management methods.
- Monitoring methodology.
- Schedules of monitoring, reporting and auditing.

ATTACHMENTS

Attachment 1. Environment Protection Guidelines – Latrobe Levee Project



ENVIRONMENTAL PROTECTION GUIDELINES

LATROBE LEVEE PROJECT

Overview

This document provides an overview of the Latrobe Council environmental management objectives, guidelines for works and services, issues to be addressed by contractors and contractor's responsibilities.

All Contractors and service providers must abide by LC's Environmental Protection Guidelines for the Latrobe Levee Project (the 'Project').

Environmental Objectives

The LC is committed to achieving high quality environmental outcomes through the implementation of effective environmental management systems, incorporating management of the environmental effects of the work and services, that are beneficial to the community and the natural environment.

Purpose

Contractors must demonstrate to the LC that the execution of works, and the provision of services will be undertaken in a manner that has minimal impact on the natural environment and as a minimum, complies with these Environmental Protection Guidelines, LC issued Ordinances and By Laws, and other relevant legislative requirements, regulations, and policies.

Environmental Protection Guidelines (EPGs)

This section contains Environmental Protection Guidelines (EPGs) which specify detailed management prescriptions in addition to the general requirements applicable to the project indicated in the previous section. The EPG's incorporate specific environmental protection requirements for the Project.

The Contractor's Construction Environmental Management Plan (CEMP) must contain the appropriate controls and avoidance/mitigation measures to described in the EPG's.

The following Environmental Protection Guidelines are included for the Project: -

EPG 1: Disturbance to Terrestrial and Aquatic Flora and Fauna

EPG 2: Erosion, Sedimentation and Surface Run-off

EPG 3: Weed and Pathogen Management and Control

ENVIRONMENTAL PROTECTION GUIDELINE Disturbance to Terrestrial and Aquatic Flora and Fauna	Document No. **EPG 1**

Objective

To minimise the impact of construction activities on local biodiversity, particularly endangered and/or protected species.

Target

No impact to biodiversity beyond that anticipated at the design phase.

Control Methods

General

- No refuelling of equipment, machines or vehicles is to occur within 10 m of a watercourse.
- Prevent the spillage of fuels, oils or other hazardous substances into drains and waterways.
- Areas of environmental significance are to be identified on the ground (including areas where endangered and/or protected species occur and must be protected from disturbance), together with the locations of fencing to prevent machinery access, in conjunction with a suitably qualified ecologist.
- The conditions of any approval permits must be adhered to.
- All site workers are to be familiar with the conditions of the permits and environmental aspects of the project at the site induction.

Protection of Fauna

- Existing crayfish burrows in the Offset Areas (Kings Park only) will be identified in the field by a suitably qualified person and marked with semi-permanent stakes with bright coloured paint. Their location will be shown to Contractors and others working in the site and directions given that they are to be retained.
- Any drains or trenches required to be dug at the site will be backfilled at the end of each working day or suitable plastic safety fencing established so that no open section of trench or earthworks remains accessible.
- Maintenance activities will be limited to daytime to avoid impacts on nocturnal fauna.
- Remove all ‘food’ rubbish to avoid attracting feral and introduced animals and birds.

Monitoring

- Weekly observation of the Work Area by the Contractor to confirm that works have not extended beyond the approved Works Area.
- Daily inspection of erosion and sediment management controls to verify their effectiveness.

- Daily inspection of burrowing crayfish habitat immediately downstream of the sites identified as susceptible to disturbance by the construction operations.

Records

Keep written records that include:

- The date and reason for each inspection.
- Details of any disturbances that need to be addressed.
- The date and time of notification to the Contractor of any failure to implement site specific management requirements.
- Directions given to the Contractor by the LC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

All records kept by the Contractor must be provided to LC for future reference.

ENVIRONMENTAL PROTECTION GUIDELINE Erosion, Sedimentation and Surface Run-off	Document No. **EPG 2**

Objective

To minimise the risk of significant erosion from the Work Area, and the avoidance of sedimentation in downstream waterways, dams, and drains during construction works.

Targets

Negligible environmental impact to waterways, drains and water bodies beyond that anticipated at the design phase.

Responsibilities

The Contractor is responsible for the construction and maintenance of the erosion and sediment control works.

The Contractor is to regularly assess the need for temporary run-off control and install and/or modify structures as required.

The Contractor is responsible for cleaning and repairing erosion and sediment control works and notifying the LC Superintendent of any failures.

The Contractor will inspect all erosion controls and sediment control works, including in adjoining waterways, keep a written record of all inspections, the observations made, and measures to be applied to effect improvements.

Control Methods

The following control measures are to be established, monitored, and maintained during the construction phase. The measures are to be fully operational and provide effective erosion control prior to disturbing adjacent ground and commencement of adjacent excavation.

The Work Area is to be inspected daily with all observations and erosion control directions documented.

The erosion and sedimentation controls must:

- Prevent sediment laden run-off entering waterways, drains and dams.
- No soil that is to be stockpiled during construction is to be transferred across a waterway or drainage or placed on the opposite side of the drain or waterway.
- Prevent soil loss from disturbed areas through wind and water erosion.
- Undertake clean-up and remediation on completion of construction.
- Sediment control equipment (applicable to the soil texture) will be installed to minimise any suspension of sediment and prevent contamination to any waterways or drainages.

- Bunding will be installed around storage areas for fuels and oils to prevent the spillage of fuels, oils, and any other hazardous substances into the water.
- Wastes (especially hydrocarbon-based products) will not to be deposited into, hosed down or swept into any waterway or soak.
- Work likely to result in sediment run-off into drains and waterways should not be carried out during wet weather.
- Refueling equipment, machines or vehicles is to occur at least 10 m from a watercourse/drain.
- A spill kit will be maintained in the Work Area near each source of fuel/oil and other chemicals. Multiple spill kits may be needed when there are multiple sources of fuel, oil or other chemicals needed for the construction process.

Monitoring

- Inspect erosion and sediment control devices daily and before and after significant heavy rainfall event (>20 mm in any 12-hr period). Additional or renewed sediment control measures will need to be applied if sediment control measures are ineffective or have failed.
- Observe erosion and sediment control devices daily to ensure correct functioning and placement and that available capacity is adequate.
- Devices should be cleaned and/or replaced as required to ensure that they are functional.

Emergency Response

In the event of a failure of erosion and sediment control devices which then causes sediment release into waterways, drains and/or watercourses the following will be implemented:

- The Contractor will reinstate the erosion and sediment controls as soon as practicable.
- The Contractor will determine whether the failure constitutes a significant threat to a waterway or drain; advice may need to be sought from an ecologist or suitably qualified person as to the potential impact a sedimentation event may have on aquatic and semi-aquatic biota.
    - If not considered a threat to waterways, procedures are to be reviewed and the LC Superintendent to be advised of, and approve, any alterations or installation of additional and/or more effective erosion control devices.
    - If the failure constitutes a threat, the LC Superintendent is to be notified as soon as practicable and within no less than 24 hours. The following may need to be applied -
        - additional and more effective erosion control devices should be installed as soon as practicable; and
        - any instructions provided by the LC Superintendent must be implemented as soon as practicable.

Records

Keep written records that include:

- The date and reason for each inspection.
- Details of any sediment control measures that have failed, become ineffective or need to be renewed/replaced. This includes photographs, diary notes or another form of recording system established by the Contractor (i.e., a).
- The date and time of notification to the Contractor by the LC Superintendent of any failure to implement site specific management requirements.
- Directions given to the Contractor by the LC Superintendent to fix any identified issues and the timeframe within which the Contractor should complete the remedial works.

All records must be provided to LC for future reference.

Objectives

To minimise the risk of transfer of weeds, plant diseases and fungal pathogens to the Work Area.

Targets

No spread of declared weeds, significant plant diseases, and fungal infestation within the Work Area or from the Work Area to other and adjoining lands.

Control Methods

PREVENTING WEEDS AND PATHOGENS BEING INTRODUCED *TO THE WORK AREA - **EQUIPMENT***

Vehicles, machinery, and equipment involved in direct excavation and construction activities at the Work Area will be washed prior to their entry into site. The washing down of vehicles, machinery and equipment will need to occur in an appropriate location, such as a hardstand associated with a works area or commercial/industrial wash bay.

The following process, or something comparable in the CEMP, should be applied in washing down vehicles, machinery, and equipment (Note: Do NOT apply water to equipment that may be damaged by water)

- Locate washdown site and prepare the surface or construct bunding as required.
- Safely park the vehicle free of any hazards (e.g. electrical), ensure the engine is off and the vehicle is immobilised.
- Look over the vehicle/machine/equipment, inside and out, for where dirt, plant material including seeds are lodged. Pay attention to the underside of the vehicle, radiators, spare tyres, foot wells and bumper bars.
- Remove any guards, covers or plates if required being careful of any parts that may cause injury.
- Knock off large clods of mud, use a crow bar if required and sweep out the cabin.
- Use a vacuum or compressed air where available for removing dried plant material like weed seeds and chaff in radiators and other small spaces where this material lodges. Brush off dry material if no other facilities are available.
- Clean down with a high-pressure hose (using potable drinking water) and stiff brush/crowbar.
- Start with the underside of the vehicle, wheel arches, wheels (including spare). Next do the sides, radiator, tray, bumper bars etc and finally upper body. Some vehicles may need to be moved during washdown to facilitate washing (e.g., tracked machinery).
- Clean associated implements, e.g., buckets.
- Check there is no loose soil or plant material that could be readily dislodged or removed.

- Wash effluent away from the machinery and do not drive through wash effluent.

PREVENTING WEEDS AND PATHOGENS BEING SRPEAD *THROUGH THE WORK AREA*

Vehicles, machinery, and equipment in direct contact with soil excavation and handling activities at the Work Area may need to be washed down or rinsed after being used in areas where there are declared weeds or known occurrences of pathogens.

The CEMP is to include a map showing where the weed and potential pathogen locations are and identified areas where machinery and equipment will be washed/rinsed to minimise the risk of spreading these vectors through the Work Area.

PREVENTING WEEDS AND PATHOGENS BEING INTRODUCED *TO THE WORK AREA – **EARTH MATERIALS***

The Project is to only use earth-based materials (rock, gravel, clay, sand etc) sourced from: -

- lawful regulated premises (i.e., those quarries/pits that have a valid Mining Lease and associated planning permit which for a Level 2 activity would include environmental conditions from the Environment Protection Authority);
- premises that have an implemented weed and pathogen management plan; and
- can confirm that they have no outstanding or unresolved environmental compliance matters with the EPA, MRT (Mining Lease matters), and/or Council (e.g., permit breaches, non-compliance with permit conditions).

Monitoring

Weekly monitoring of machinery/equipment and earth-based materials, and location of stockpiles, especially for any germination of declared or environmental weed species (advice on weed identification may need to be sought from a suitably qualified person).

Follow-up monitoring to be undertaken post construction and post rehabilitation for identification and appropriate additional control as disturbance from construction works is likely to stimulate germination of a range of weed species.

Records

Written records should be kept that include:

- The date and reason for each inspection.
- Details of any non-conformance with control measures.
- The date and time of any notification to the Superintendent of any failure of control measures.

Rehabilitated area inspections are to occur during the construction phase for the presence of introduced flora species are the results are to be documented.

All records must be provided to LC for future reference.

Attachment 2. Operating Procedure – Latrobe Levee Project, Central North Burrowing Crayfish Salvage and Translocation



OPERATING PROCEDURE – LATROBE LEVEE PROJECT

CENTRAL NORTH BURROWING CRAYFISH SALVAGE AND TRANSLOCATION

ENVIRONMENTAL MANAGEMENT OVERVIEW

This Operating Procedure (OP) provides an overview of the environmental management objectives and procedures to salvage and translocate *Engaeus granulatus* as part of the Latrobe Levee project**.**

This OP must be read in conjunction with the *Offset Management and Monitoring Plan*.

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
LC	Latrobe Council
OMMP	Offset Management and Monitoring Plan
OP	This Operating Procedure

Terms

Work Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Contractor	The company/entity engaged to perform the Project
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: Kings Park and River Road.
Project	The Latrobe Levee Project

OBJECTIVE

To maximise the number of Central North burrowing crayfish (*Engaeus granulatus*) successfully salvaged and translocated from the Work Area to the Offset Sites.

TARGETS

- No impact to threatened flora and fauna species (except Central North burrowing crayfish, CNBC) at and near the Work Area beyond that anticipated at the design phase of the Project.
- Maximum number of CNBC successfully salvaged and translocated from the Work Area to the Offset Sites.
- Minimal mortality of CNBC during the excavation and salvage process.

RESPONSIBILITIES

Except for when the LC is the permit holder, LC has a responsibility to sight the necessary permits from the Contractor before they engage the Contractor to conduct the salvage and translocation works.

The Contractor is responsible for applying any conditions associated with permits issued to conduct the translocation of CNBC. Only suitably qualified Contractor's that can lawfully perform the tasks and duties of this OP will be engaged by LC.

PERMITS

Any specific conditions contained in permits obtained for the Project must be strictly adhered to.

PROCEDURES

OFFSET SITE ESTABLISHMENT

- The Offset Sites must have been prepared to receive the salvaged CNBC prior to the commencement of CNBC in the Work Area. The Offset Site establishment process is described in the *Offset Management and Monitoring Plan*.
- Salvage and translocation should occur when soils at the Work Area and Offset Sites are sufficiently moist/damp. CNBC are more likely to be closer to the surface allowing easier excavation of burrows and new burrows can be easily established at the Offset Sites.
- Translocation should be avoided during spring/summer when crayfish are breeding, and juveniles have not yet dispersed. If translocation cannot be avoided during this time, then a supplementary watering system must be installed to establish and maintain favourable soil moisture conditions until natural rainfall provides sufficient moisture to the Offset Sites.

PREPARATION FOR CNBC SALVAGE

- At least 7 days prior to the salvage and translocation of CNBC, a suitable CNBC translocation area in each Offset Site will be identified on-ground by a suitably qualified ecologist using steel droppers (fitted with safety caps) and orange plastic (safety-style) fencing.
- Holes will be created in that area into which CNBC can be placed (at least 30 at the start of the salvage and translocation process, more can be made if required).
- Holes should be no less than 20 cm apart and should be dug to the water table if possible or, at the least, wet/damp sub-soil using a screw-type auger or similar. Holes will be at least 1 inch wide (25 mm) and partially filled with dechlorinated potable water if the water table is not reached during the hole creating process.

SALVAGE AND EXCAVATION PROCESS

- All site workers at the site induction are to be made aware of the conditions of the permits and environmental aspects of the Project.
- A suitably qualified ecologist is to mark with flagging tape or survey marker paint the boundary of the Work Area (there are three locations – River Road, Kings Park and Sammy's Creek) which is to be excavated to salvage CNBC.

- Hand tools (e.g., trowel, spade, shovel etc) are to be cleaned in F10 (a disinfectant) will be used as the main means to excavate CNBC from the Work Area.
- On the advice of a suitably qualified ecologist, an excavator may be used to excavate those areas where hand tools are impractical (e.g., deep burrows, confined space, danger of drain collapse). The suitably qualified ecologist will establish with the excavator operator(s) the process of excavation (e.g., decide on hand signals for directions, timing of excavation and direction within the drains, direction of excavation, technique of excavation and depth (to minimise risk of injury to CNBC)).
- Only persons authorised by LC and with the necessary cover of a permit from DPIPWE will handle CNBC.
- CNBC once recovered will be –
    - examined to check that they have not been compromised by the excavation process.
    - washed free of dirt and mud from the excavation site by placing them into a container of dechlorinated potable water (tap water that has been allowed to sit in a vented container for at least 72 hours).
    - cleaned in a second container of dechlorinated potable water.
    - identified to species level (to confirm the animal is CNBC, and if it is not, which species of *Engaeus* it is) and placed into a plastic container with dechlorinated potable water and covered with a lid with a few air holes. Containers will be stacked into an Eski (or similar) with ice in the base covered by a folded towel.
    - When 15 animals have been salvaged, or if 1.5 hours has passed since the first held CNBC was salvaged, whichever occurs first, then the held salvaged CNBC will be introduced to the Offset Sites.

INTRODUCTION TO OFFSET SITES

- CNBC will be placed tail first into the pre-prepared holes (only one crayfish placed in each created hole) and marked with a weed mat stake marked with flagging tape (pink or blue).
- A sketch 'map' of the Offset Sites will be prepared post-translocation of all the salvaged CNBC noting the: -
    - Any pre-existing likely occupied burrows;
    - burrows inhabited by injured, but not compromised, animals (e.g., one front claw missing); and
    - burrows occupied by gravid females (if present).

CNBC COMPROMISED DURING THE SALVAGE AND EXCAVATION PROCESS

- Compromised CNBC, in the opinion of a suitably qualified person, may include CNBC that have lost both front claws (but not animals that retain one front claw unless they have other injuries), have sustained an injury to their thorax, head or abdomen from which they are unlikely to recover or are only partially complete (e.g., have been decapitated or cut in half by the excavation process). These

CNBC are to be: -

- Euthanised in a solution of MS22 or AQUI-S until such time they are deemed to be dead (any leftover solution will be disposed of in accordance with the manufacturer's directions);
- Placed into preserving jars containing 90% ethanol for preservation: and
- Specimens offered to a research institution (on advice from DPIPWE) such as the Tasmanian Museum and Art Gallery (TMAG), Queen Victoria Museum and Art Gallery (QVMAG), or University of Tasmania (Utas) for addition to any existing collection for future research opportunities.

MONITORING

It is important that the success or otherwise of the project be assessed against key criteria. Monitoring is described in the *Latrobe Levee Project Offset Management and Monitoring Plan*.

RECORDS

Written records and field notes must be provided to LC for future reference and reporting to regulatory authorities if required.

Written and photographic records of the salvage and translocation process must be kept by the Contractor, including: -

- the date of excavation works, weather conditions, the names of persons involved in the excavation process;
- the number of animals (alive and intact) salvaged/excavated and translocated; and
- the number of animals euthanised and preserved.

The date and time of notification to the Contractor of any failure to implement site specific management requirements.

Directions given to the Contractor by the LC Superintendent to fix any identified issues and the timeframe within which they should complete the remedial works.

Attachment 3. Photopoint Guidelines

Using photographs to visually record change in your bush

It is important to take photographs of your bush as part of the health assessment process as they give a faithful visual record of change in your bush. They are cheap, effective and require no specialist equipment. A simple and consistent way to take photographs of your bush is to establish a 'photo point site'. A 'photo point site' is a site from where a series of photographs are regularly taken. You can establish several photo point sites in your bush, or elsewhere on your property where you want to use photographs to visually record change in the landscape. For example, if you want to visually examine the impact of different land uses on each side of a fence that runs through native bush (ie one side is stock grazed and the other is not) take photographs looking down the fence line.

Photo point site location

When you select a photo point site make sure that it is typical of the bush you are assessing. Additional photo point sites can be established across your site/zone if you wish. When establishing a photo point site there are a few guiding principles to be aware of:

- Avoid steep slopes as they will make the photographs difficult to interpret.
- Try to locate the photo point site so it faces southwards to minimise sun glare. If this is not possible (ie you are taking photos of a south facing slope) reduce the glare by taking your photographs at a suitable time of day. If light conditions are not very good to take the photograph then come back when they are suitable.

Aim to take a photograph at each photo point site at least once a year and each time you conduct a bush health assessment of the site/zone. Take a photograph after every significant event at the site, such as after stock have been removed from an area, following a fire, or after major on-ground works have taken place (eg weed removal). Remember that a photograph showing no change may be just as important as one showing considerable change.

Equipment needed per photo point site

For each photo point site you will need:

- two star droppers or other marker posts, at least 1.6 m tall
- one labeling tag and numbering tool (or number the droppers before you go to the site)
- fine metal wire or a metal tie
- a pair of pliers
- a SLR camera with a standard 50 mm lens and colour film (a 50 mm lens is recommended as it closely approximates how the human eye perceives objects)
- a sledge hammer
- a 10 m tape measure
- a supply of 'Photo point information cards'
- a pen or pencil, sticky tape and a white board marker pen.

Setting up the photo point site

The layout of posts for each photo point site is shown in Figure 2.

- At the point from which you will take your photographs, hammer a dropper post into the ground so the top is close to eye level (1.4–1.6 m). This is the 'camera post'. The camera will be placed on top of this post when taking the photographs to ensure they are all taken from the same height. Record the height of the post on a 'Photo point information card' when you first take your photo in case it falls over and you need to hammer it back into the ground on your next visit.
- Hammer in another dropper post 10 m from the camera post along the direct line of sight to the vegetation, landscape or feature being monitored. This is the 'sighter post'.
- Both posts should be secure and difficult to remove. If vandalism could be a problem at your site hammer small marker pegs or decking nails into the ground at the base of each post to make

relocation possible should the post be removed. Recording the grid co-ordinates of each post with a geographic positioning system (GPS) and drawing a site map that accurately marks the location of both posts will also make relocation of the posts easier.

- Wire a metal labeling tag with the relevant photo point site identification code (see below) to the camera post above where it may be grazed by stock or native animals.

Taking the photograph

Attach an A4-sized data board (eg small whiteboard or an A4 piece of paper) to the 'sighter post' about half way up its height (Figure 2). Write the date and photo point identification code on the data board. The writing should be large enough to be readable on the developed photograph. When taking your photograph:

- Always use the same camera type (eg a 35 mm SLR with a standard 50 mm lens), or preferably the actual same camera
- Hold the camera on the 'camera post' and face the 'sighter post'. Focus the camera on the top of the 'sighter post'.
- Use a shutter speed of between 1/250 sec and 1/60 sec as this will provide good exposure and minimises the risk of the photograph being blurry. Come back another day if the lighting is poor.
- Avoid getting any bright glare in the lens.
- Always take more than one shot to make sure you get at least one good photograph.
- Number and file the photographs after developing and keep the negatives in a safe place such as a photo album. If required you could get the photographs scanned and stored on a CD when you get the film processed.

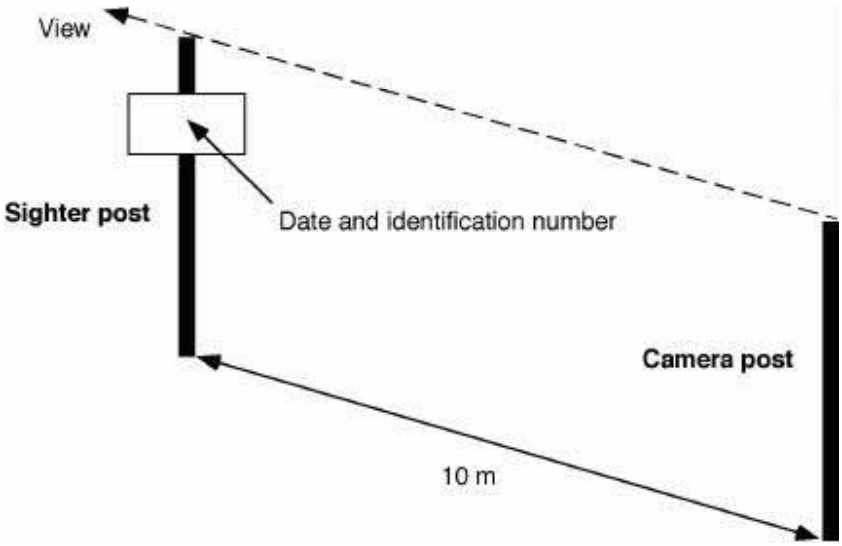


Figure 2. Layout of posts at a photo point site.

Recording photo point site information

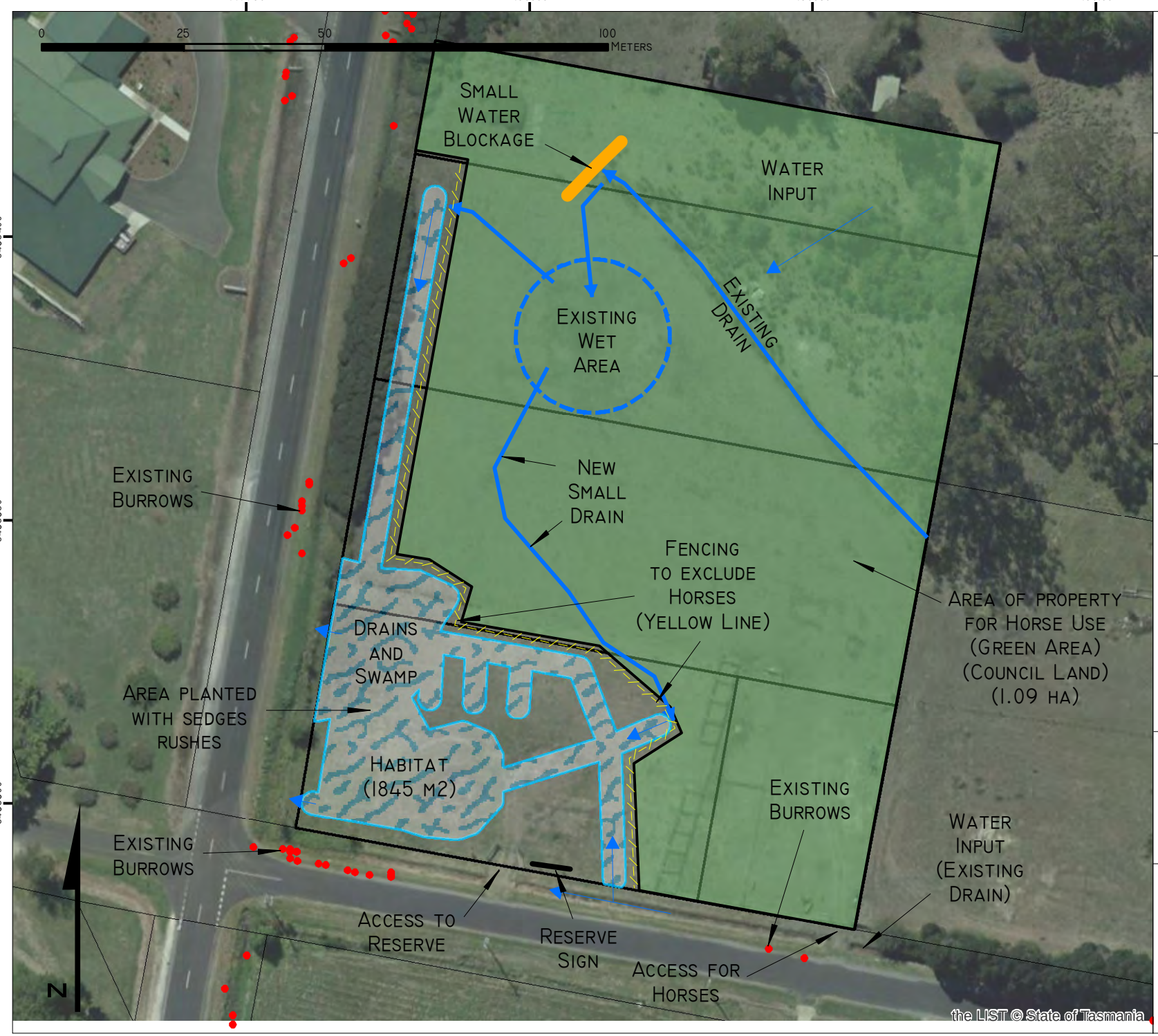
Each photo point site must be given a unique identification code so it can be clearly distinguished from all the other photo point sites you establish. The code should be meaningful. For example, it could be JB12, which means it is photo point site 12 on John Brown's property.

For each photo point site record the following information on a 'Photo point information card': date; location, direction (compass bearing) and purpose; the number of the photographic negative; and any observations about the site. Complete a new photo point information card each time you revisit the photo point to take a photograph.

Photo Point Site Information Card

Photo point site identification code.	Date.
Location.	Photographer.
Grid coordinates of camera post.	Grid coordinates of sighter post.
Height of camera post.	Direction of photo.
Purpose of photo.	
Site observations and notes.	
Photo.	

Attachment 4. River Road Offset Site Detailed Design



LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

ATTACHMENT 4. RIVER ROAD OFFSET SITE DETAILED DESIGN

TASMAP:	LGA:
LATROBE	LATROBE

BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA

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PO Box 1 New Town TAS 7008

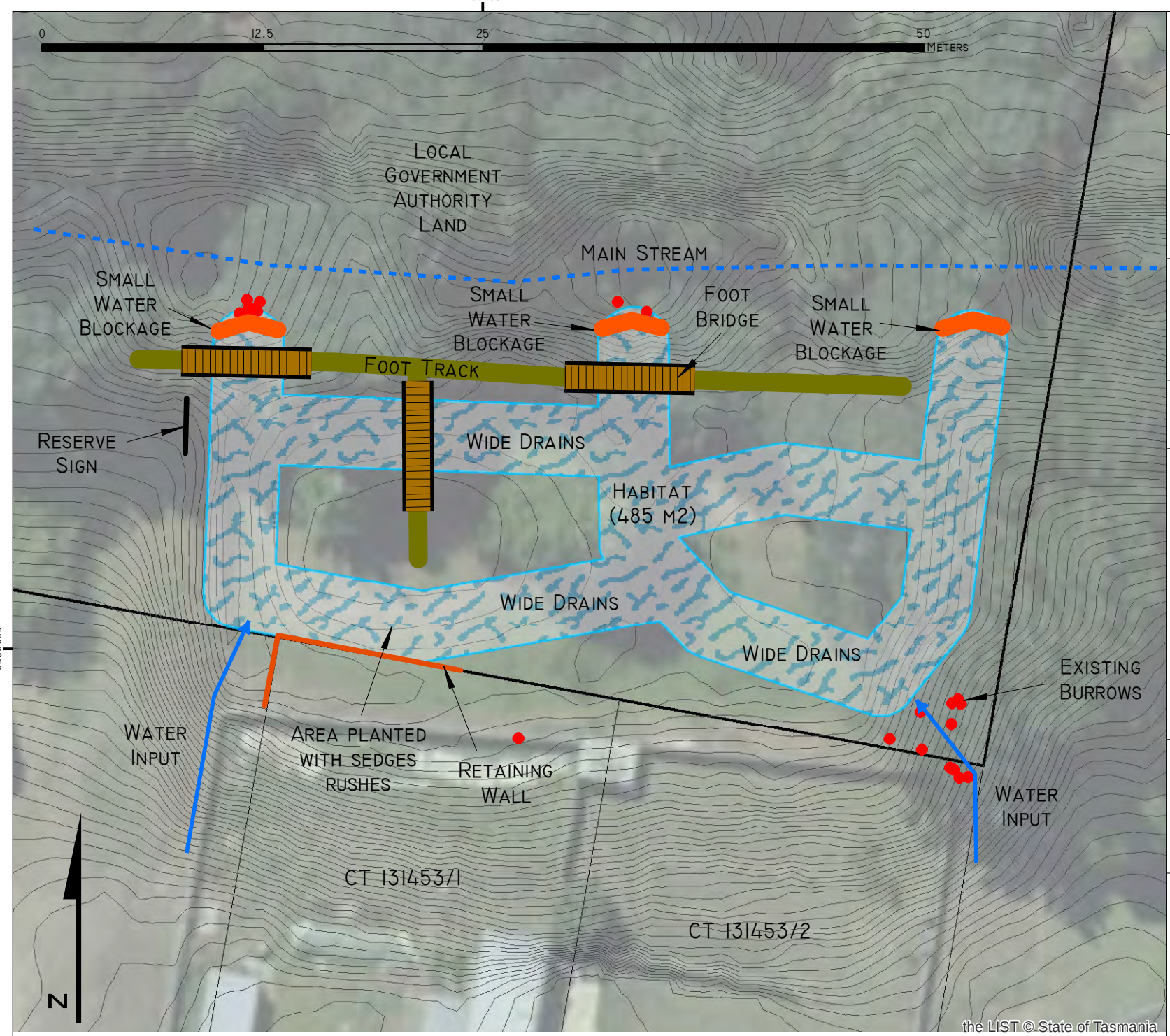


DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT:
BRIDGEPRO
ENGINEERING

DATE: 29 NOV 2021

Attachment 5. Kings Park Offset Site Detailed Design



LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

ATTACHMENT 5.
KINGS PARK OFFSET
SITE DETAILED DESIGN

TASMAP:	LGA:
LATROBE	LATROBE

BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA

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PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT:
BRIDGEPRO
ENGINEERING

DATE: 29 NOV 2021

Attachment 6. Indirect Impact Monitoring Procedure – Latrobe Levee Project

INDIRECT IMPACT MONITORING PROCEDURE – LATROBE LEVEE PROJECT

CENTRAL NORTH BURROWING CRAYFISH

PURPOSE

This Procedure outlines the methods to monitor for post-construction indirect impact to burrows and habitat of CNBC downstream of proposed works areas – River Road to Bells Parade, Sammy's Creek and Kings Creek.

This Procedure must be read in conjunction with the *CNBC Offset Management and Monitoring Plan*.

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
LC	Latrobe Council
OMMP	CNBC Offset Management and Monitoring Plan

Terms

Work Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: Kings Park and River Road.
Project	The Latrobe Levee Project

OBJECTIVE

- To determine if there is or has been a Project caused impact to CNBC burrows and habitat downstream of the Work Area post-construction of the Project.

TARGETS

- No Project caused impact to CNBC burrows and habitat downstream of the Work Area post-construction of the Project.

RESPONSIBILITIES

Except for when the LC is the permit holder, LC has a responsibility to sight the necessary permits from the Contractor before they engage the Contractor to conduct the salvage and translocation works.

LC is responsible for reporting the findings of the monitoring to the relevant authorities.

PERMITS

Any specific conditions contained in permits obtained for the Project must be strictly adhered to.

MONITORING

Locations

A suitably qualified ecologist will select areas within the three indirect impact areas (Figure 5).

Areas will be selected based on CNBC being present and, in a density, greater than 0.2 burrows/m^2. Selected sites will be suitably tagged/identified for future reference

.

Parameters and Frequency

Table 1 provides the parameters to be monitored including their respective method and frequency. Monitoring is unlikely to be needed after 3 years as any indirect impact caused by the Project post-construction should be evident by then.

Table 1. Monitoring parameter and frequency for selected indirect impact areas post-construction

Parameter	Tasks	Frequency	Qualification to conduct task
Burrow number	Burrow count and assessment of activity/life history traits Photopoints	1, 36 and 52 weeks after practical completion then once every 12 months for 3 years.	Suitably qualified ecologist
Erosion and/or sedimentation	Photopoints	1, 36 and 52 weeks after practical completion then once every 12 months for 3 years.	Suitably qualified ecologist

Trend assessment

A suitably qualified ecologist will consider the results obtained from the monitoring at no later than the third event (being at the conclusion of week 52 from practical completion) to determine if there are any trends evident. Trends may include a reduction in vegetative cover, increase in vegetative cover, reduction in burrow number or increase in burrow number, additional or loss of soil and gravel from an area, etc. The trends may be different at each of the locations or between sites within each location.

In the very unlikely event that there is a loss of burrows then consideration will need to be given to the reasons why, and if those reasons appear to be related to the installation of the Project, then advice will be sought from the DAWE about the need for further offsets to compensate for that impact.

RECORDS

Written records and field notes must be held by LC for reporting to regulatory authorities.

Results must be reported within the Annual Report.

Attachment 3. Latrobe Levee Project - EPBC2020/8846, CNBC salvage and translocation reporting

LATROBE LEVEE PROJECT - EPBC 2020/8846

CENTRAL NORTH BURROWING CRAYFISH

SALVAGE AND TRANSLOCATION REPORTING



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Figure 2 Location of Latrobe township showing key locations and features

Figure 3A Project Infrastructure – full extent with closeup figures shown

Figure 3B Project Infrastructure in north-western section and locations

Figure 3C Project Infrastructure in south-eastern section and locations

Figure 4A Burrowing crayfish direct and indirect habitat loss area – River Road

Figure 4B Burrowing crayfish direct and indirect habitat loss area – Kings Park

Figure 4C Burrowing crayfish direct and indirect habitat loss area – Victor Street

Figure 5A Offset Site locations relative to Project infrastructure

Figure 5B Central north burrowing crayfish translocated to the River Road Offset Site

Figure 5C Burrowing crayfish translocated to the Kings Park Offset Site

ACRONYMS

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
DAWE	Department of Agriculture, Water and Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
OP	Operating Procedure – Latrobe Levee Project, Central North Burrowing Crayfish Salvage and Translocation (**Attachment 2**)

TERMS

Approval	The approval made by DAWE dated 6 June 2022 for the Latrobe Levee, Latrobe, Tasmania (EPBC 2020/8846)
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: River Road and Kings Park.
Project	The Latrobe Levee Project (EPBC 2020/8846) which is the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of setdown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.

EXECUTIVE SUMMARY

The Latrobe township is located in the lower Mersey River catchment along the mid-north coast of Tasmania. In 2016, the highest floods on record were experienced in the Mersey River at Latrobe Bridge, which inundated a large area of the township. The severity of the June 2016 flood and the subsequent impact on the Latrobe township led Latrobe Council (LC) to propose the installation of flood mitigation measures for the township.

Latrobe Council proposed to construct levees around the township's south-western and southern perimeter, a flood gate structure (lower Kings Creek) and a peak-flow flood diverter on Kings Creek at Kings Park (the 'Project'). The levee system has been designed to reduce the risk of flooding from the Mersey River and Kings Creek to the Latrobe township but does not permanently impound water. Rather, it prevents floodwaters entering the town's central business district and nearby residential areas during a major flood event.

A Referral was made to the Department of Agriculture, Water, and the Environment (DAWE, but now DCCEEW) because of the direct and indirect impact to *Engaeus granulatus* (central north burrowing crayfish, CNBC); a species listed as endangered on the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Project was assessed by Preliminary Documentation, with the residual impact to CNBC addressed by the establishment of two Offset Sites to where salvaged animals from the works areas would be translocated.

The Project was approved by DAWE (now DCCEEW) with conditions. The Approval contained the following condition of relevance to this document:

7. Within 6 weeks following **salvage** and **translocation** of the **Central North Burrowing Crayfish,** the approval holder must provide a report to the **department** that specifies the number of **Central North Burrowing Crayfish** that have been identified by a **suitably qualified ecologist** as:
    a. successfully **salvaged**,
    b. successfully **translocated**,
    c. euthanised during **salvage** and **translocation**, and
    d. died during **salvage** and **translocation**.

Four *Engaeus* animals were salvaged and translocated successfully from the impact areas of the Project.

None were euthanised and none died during the salvage and translocation.

The two successfully salvaged and translocated animals from the River Road impact area were positively identified as *Engaeus granulatus* by Dr Colin McCoull. The other two were salvaged from near Sammy's Creek (Victor Street) under the Unexpected Discovery Procedure by Treloar Civil and Quarries and BridgePro Engineering – these animals were not identified to species level but are likely to be *Engaeus granulatus*.

PART A - INTRODUCTION

A.1 Project Background

Latrobe Council proposed to construct a levee system to reduce the risk of flooding from the Mersey River and Kings Creek to the township of Latrobe (**Figures 1 and 2**). These water courses flow past and through the town respectively (**Figure 2**). The levees are to be built around Latrobe township's south-western and southern perimeter as well as a flood gate structure (lower Kings Creek) and a peak-flow flood diverter on Kings Creek at Kings Park (**Figures 3A, 3B and 3C**).

The Project will cause a direct impact to the endangered central north burrowing crayfish (CNBC, *Engaeus granulatus*). The VDC (2021) survey and assessment calculated the direct impact to 66 burrows for the three CNBC Impact Areas at Kings Park, River Road, and Victor Street (**Figures 4A, 4B and 4C**; see **Table 1**).

Table 1. Habitat and burrows of central north burrowing crayfish directly lost by the Project

CNBC Impact Area	Habitat Loss (square metres)	Burrows Lost (number)	Burrow density (number/m^2)
River Road	287.48	47	0.09
Kings Park	301.67	13	0.04
Victor Street	46.67	1	0.02
TOTAL	**635.82**	**66**	

CNBC were planned to be salvaged and translocated from the Project Impact Areas to the Offset Sites (see **Figure 5A**) – those CNBC near River Road were to be translocated to the River Road Offset Site and those at Kings Park and Victor Street were to be translocated to the Kings Park Offset Site. The design and method of habitat creation at each Offset Site is the subject of this *Offset Management and Monitoring Plan*.

The salvage and translocation methodology used (as documented in the Preliminary Documentation and its associated Offset Management and Monitoring Plan) is described in **Attachment 2**.

A.2 Relevant Approvals

A.2.1 Environment Protection and Biodiversity Conservation Act 1999

The Project was approved by DAWE (now DCCEEW) with conditions. The salvage and translocation of CNBC from the impact areas to the Offset Sites (**Figure 5A**) was required by the Approval.

The Approval contained the following condition of relevance to this document:

7. Within 6 weeks following **salvage** and **translocation** of the **Central North Burrowing Crayfish,** the approval holder must provide a report to the **department** that specifies the number of **Central North Burrowing Crayfish** that have been identified by a **suitably qualified ecologist** as:

    a. successfully **salvaged,**

    b. successfully **translocated,**

    c. euthanised during **salvage** and **translocation**, and

    d. died during **salvage** and **translocation.**

A.2.2 Threatened Species Protection Act 1995

The Department of Natural Resources and Environment (DNRE) issued a permit to 'take' *Engaeus granulatus* (Permit No. DA 22286, **Attachment 1**).

DA22286 contains the following conditions of relevance to this report:

5. Collection and handling of the threatened fauna specified on this permit is to be undertaken by, or under the direct supervision of, a suitably qualified and experienced person. Injury or killing of the specified threatened fauna must be avoided or minimised.

6. Animals from River Road and Victor Street must be relocated to the River Road offset site and animals from Kings Park must be relocated to the Kings Park offset site - as shown in Schedule 3.

7. Habitat creation and enhancement works at the Kings Park offset site are to occur in the following manner: earthworks must be undertaken at a minimum 14 days prior to translocation and plantings must be undertaken at a minimum 7 days prior to translocation.

8. Habitat creation and enhancement works (earthworks and plantings) at the River Road offset site are to occur at a minimum two months prior to the translocation.

9. Horses must be excluded from the River Road offset site prior to the translocation of any crayfish.

10. Salvaged animals are to be placed in their own individual storage jar (each jar should be of sufficient size to contain the animal but limit their movement within the jar) containing local, fresh, unchlorinated water.

11. Animals must be placed in artificial burrows at the translocation sites at a density of no more than three (3) individuals per square meter.

12. Animals that have injuries from which they are unlikely to recover (e.g. injury to the thorax or head) are to be placed in their own individual container with unchlorinated, fresh water and then placed on ice in a cooler or refrigerator for 2 hours. Animals are then to be euthanised in an ice slurry for 30 minutes.

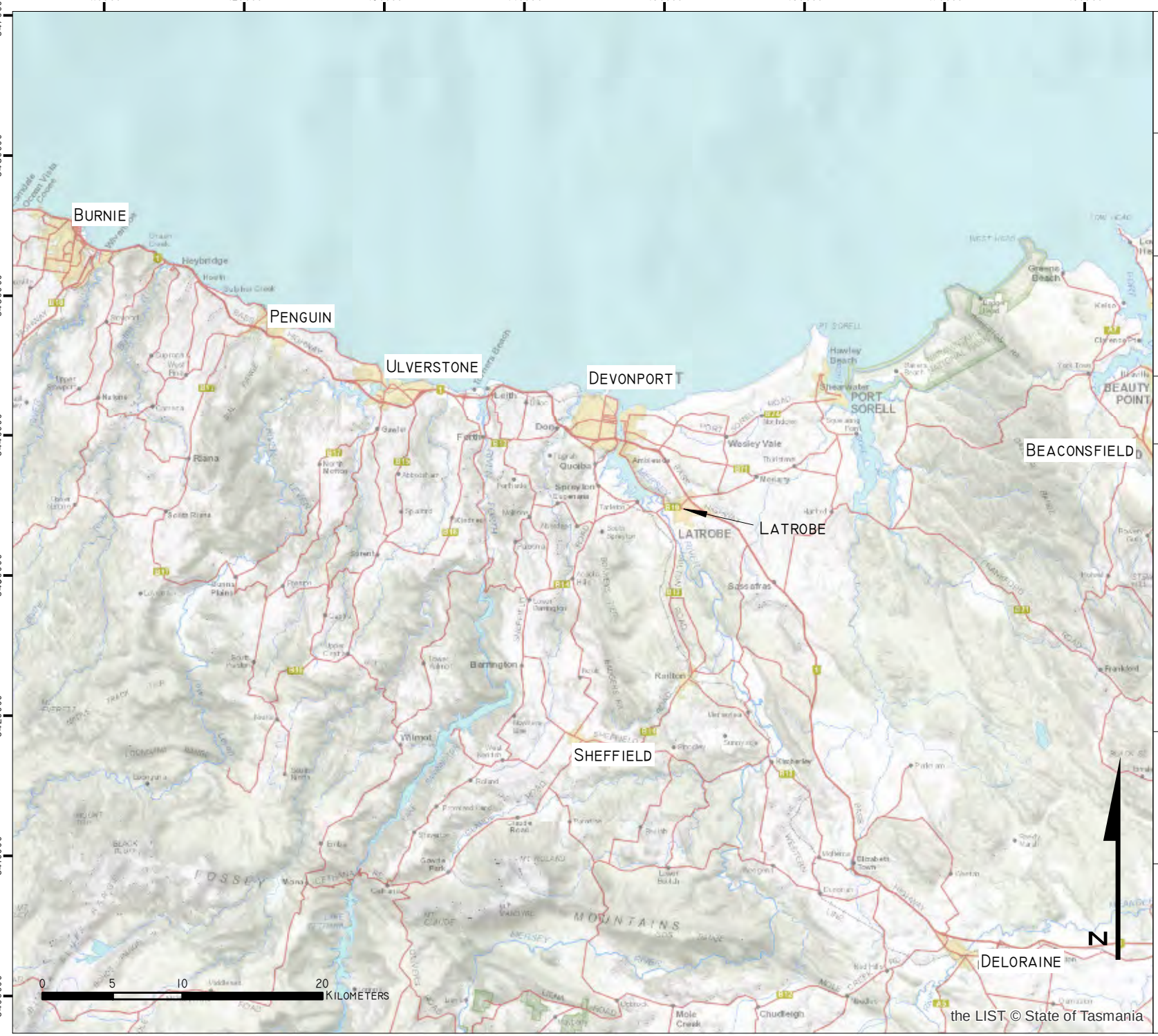
13. Dead animals are to be placed into preserving jars containing 90% ethanol for preservation and be offered to an appropriate institution (such as the Queen Victoria Museum, Launceston) as soon as practicable.

LATROBE LEVEE PROJECT

ENGAEUS GRANULATUS SALVAGE AND TRANSLOCATION REPORT

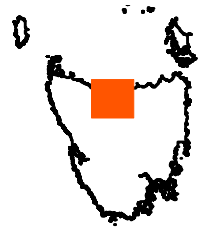
FIGURE 1: LOCATION OF LATROBE TOWNSHIP IN CENTRAL NORTH TASMANIA

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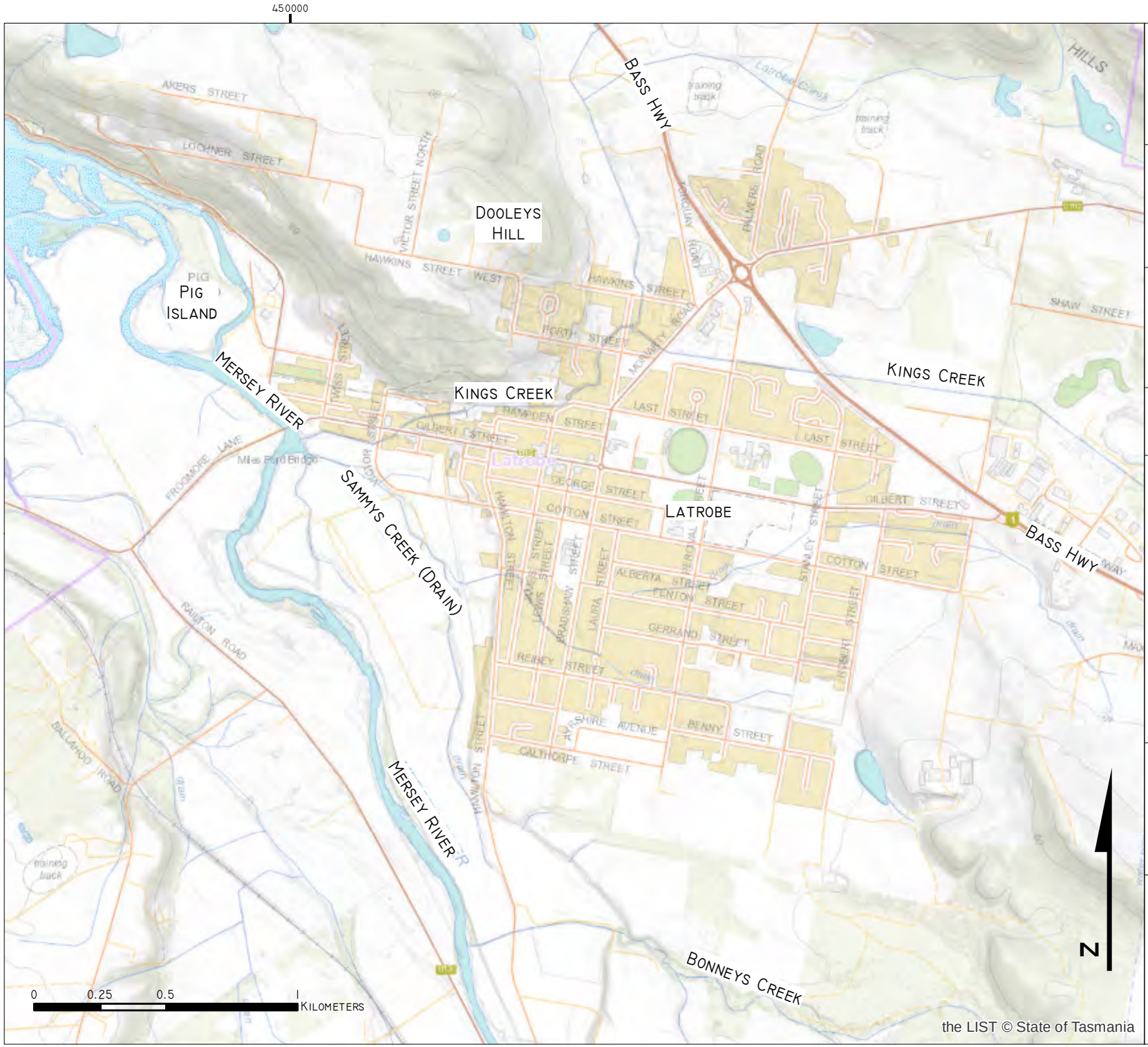
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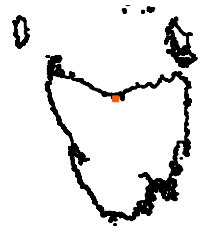
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FIGURE 2: LOCATION OF LATROBE TOWNSHIP SHOWING KEY LOCATIONS AND FEATURES

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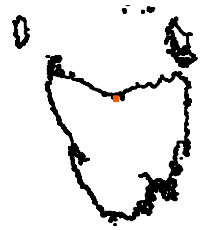
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FIGURE 3A: PROJECT INFRASTRUCTURE – FULL EXTENT WITH CLOSEUP FIGURES SHOWN

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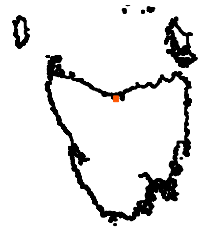
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FIGURE 3B: PROJECT INFRASTRUCTURE IN NORTH-WESTERN SECTION AND LOCATIONS

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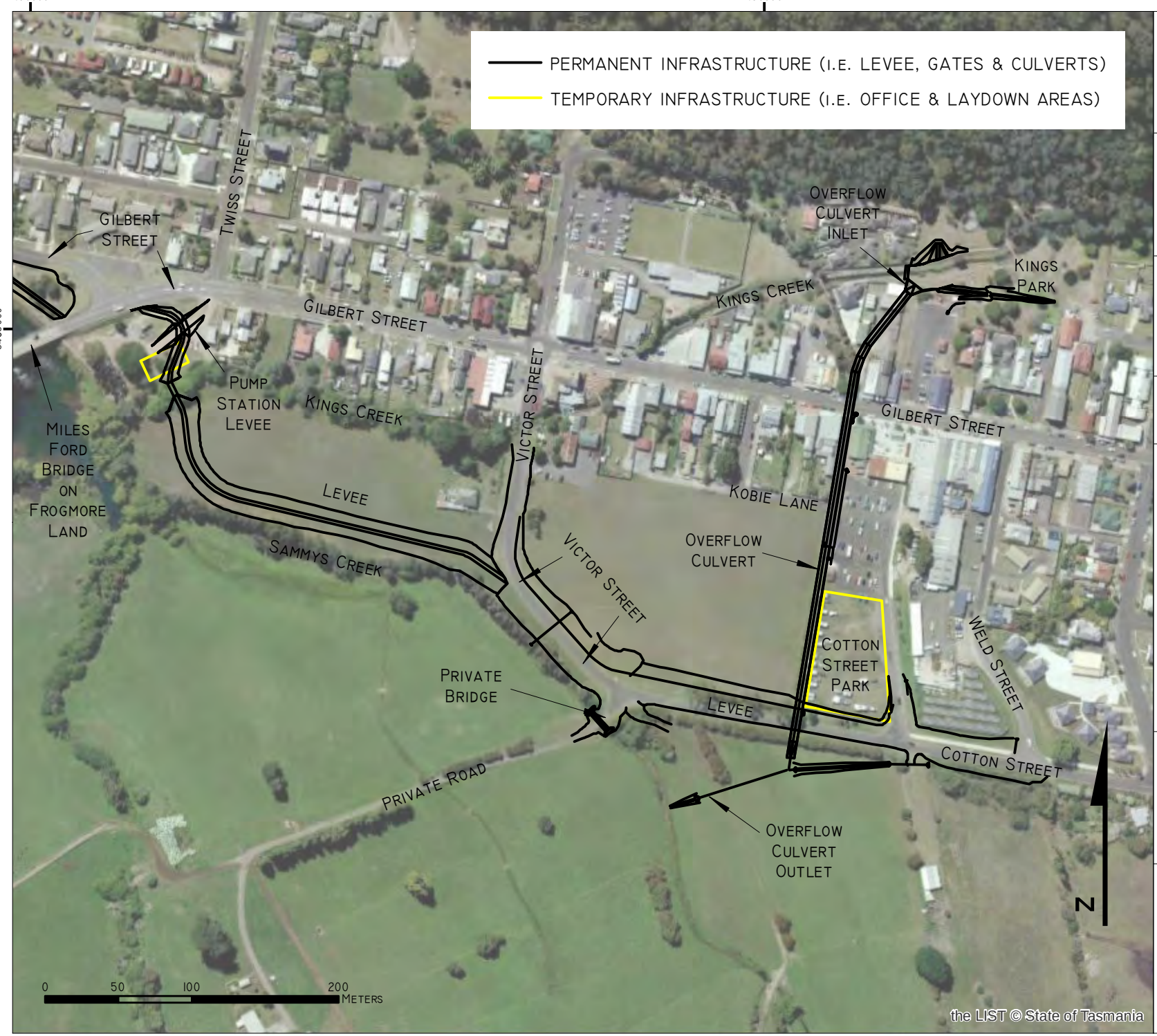
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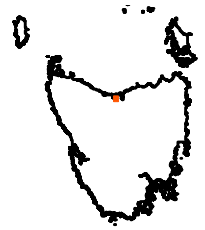
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FIGURE 3C: PROJECT INFRASTRUCTURE IN SOUTH-EASTERN SECTION AND LOCATIONS

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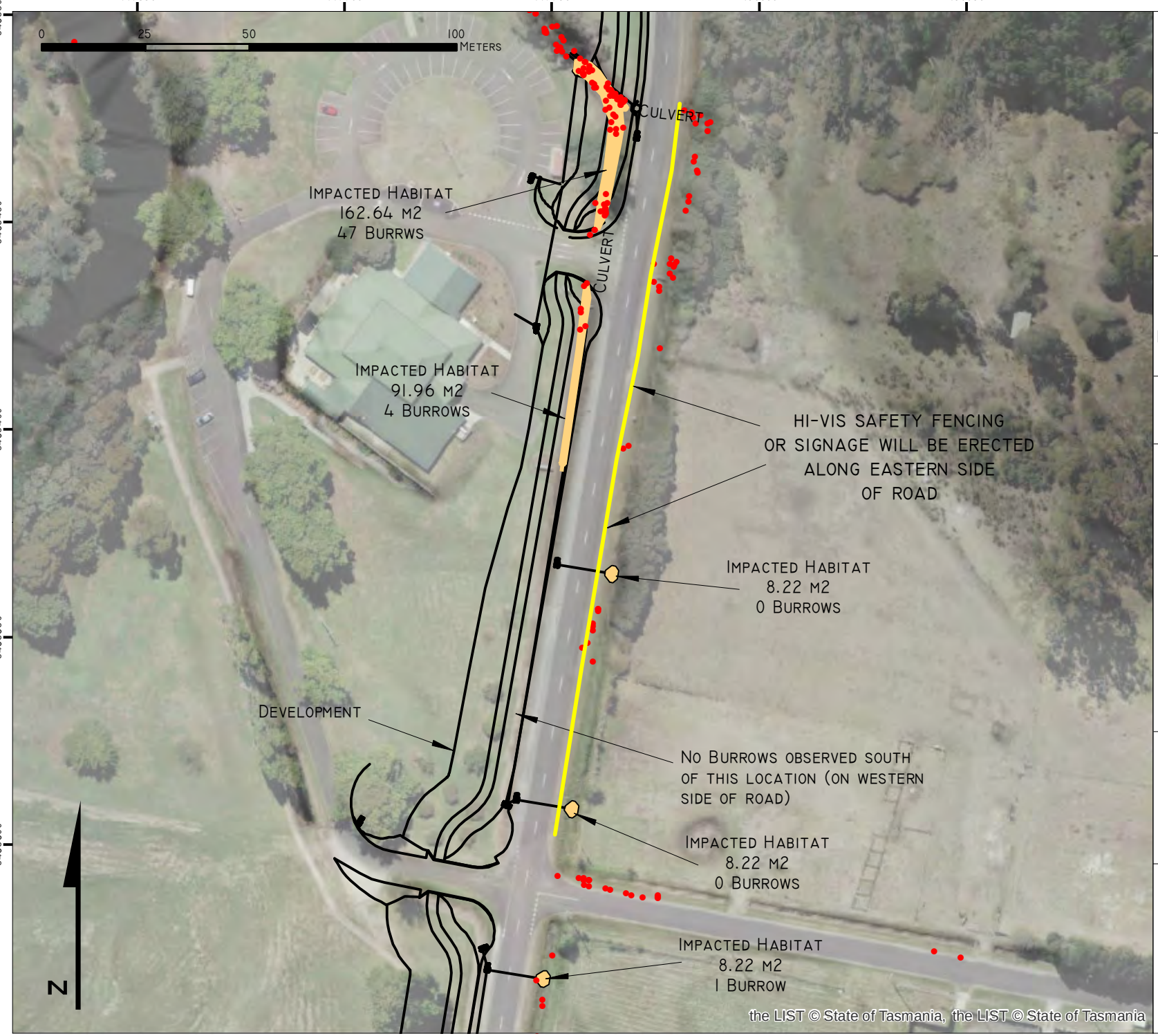
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A.3 Objectives

The objectives of this report are to provide:

- information about the salvage and translocation process for Central North burrowing crayfish associated with the Project,
- the required information to meet condition 7 of the Approval EPBC 2020/8846, and
- the required information of the permit issued by the Department of Natural Resources and Environment for DA22286.



LATROBE LEVEE PROJECT

ENGAEUS GRANULATUS SALVAGE AND TRANSLOCATION REPORT

FIGURE 4A: BURROWING CRAYFISH DIRECT AND INDIRECT HABITAT LOSS AREA – RIVER ROAD

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FIGURE 4B: BURROWING CRAYFISH DIRECT AND INDIRECT HABITAT LOSS AREA – KINGS PARK

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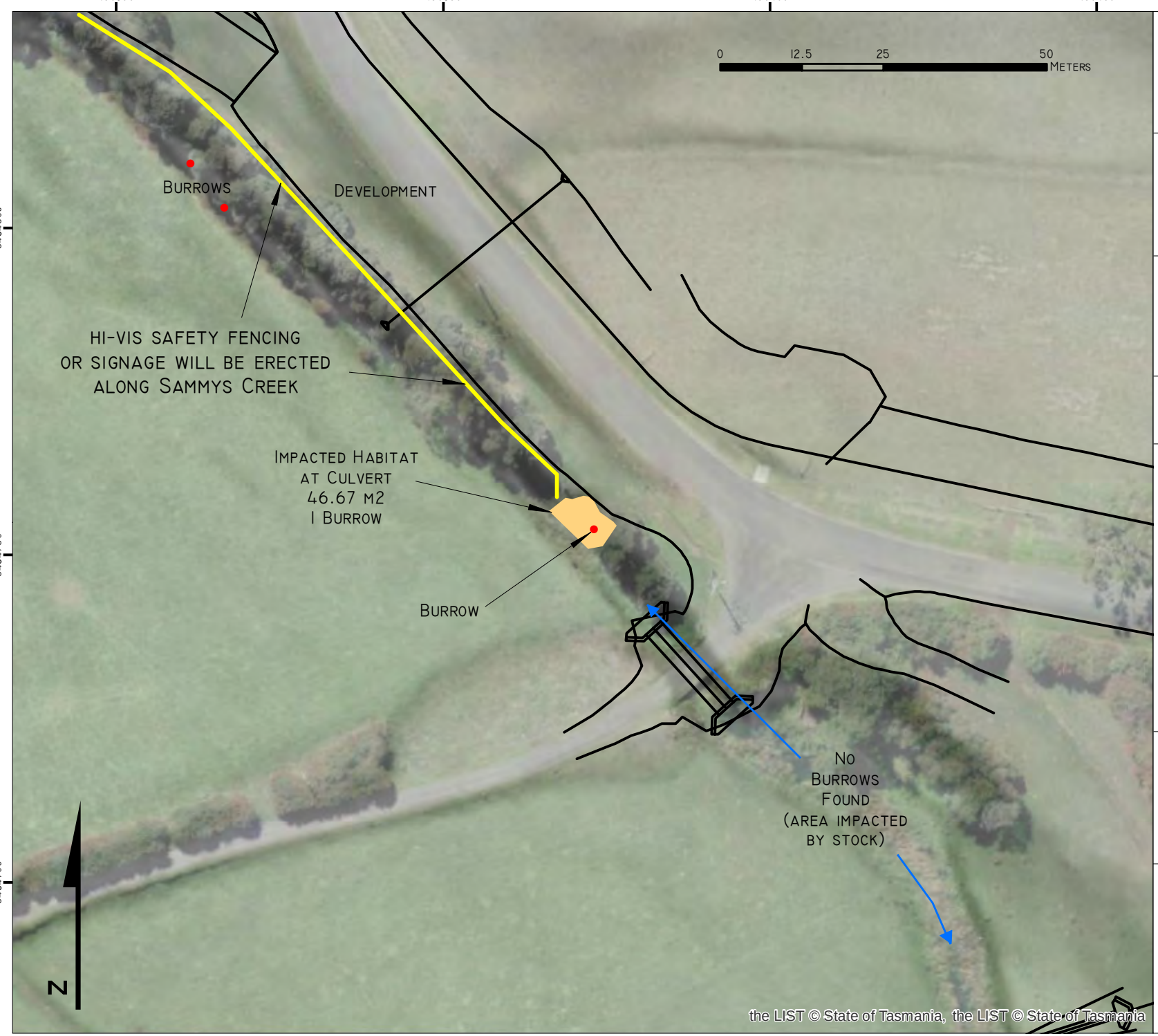
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FIGURE 4C: BURROWING CRAYFISH DIRECT AND INDIRECT HABITAT LOSS AREA - VICTOR STREET

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PART B – OFFSET ESTABLISHMENT

The salvage and translocation process was directly related to the establishment of Offset Sites to where CNBC were to be translocated. The location of the Offset Sites are provided in **Figure 5A.**

B.1 Location and Tenure

The Offset Sites – River Road and Kings Park (**Figures 5B and 5C**) – were chosen after careful consideration of the land tenure and long-term security prospects of the site, potential for habitat at the site to be enhanced and/or habitat areas created and sustained for the long-term for CNBC and the quantum of the residual impact needing to be offset.

Table 2 provides details of the address and tenure at each Offset Site.

Table 2. Offset Site location and land tenure

Attribute	Offset Site 1	Offset Site 2
Reference Name	River Road Offset	Kings Park Offset
Physical Address	RIVER RD LATROBE TAS 7307	HAMILTON ST LATROBE TAS 7307
Access	Last Street West	Kings Lane and Kings Park
Certificate of Title (PID)	223225/1, 153484/1, 46134/7, 233419/1 (3170515)	25603/7 (6537888)
Landowner	Latrobe Council	Latrobe Council

B.2 River Road Offset Site establishment works

The Offset Site (**Figure 5B**) is located on the junction of River Road and Last Street West, with an existing access from Last Street West. The location has been used for the temporary housing of horses by those participating in the Tasmanian Trail – Latrobe is on the route from Devonport to Dover.

Hand tools (pre-cleaned with F10) were used to excavate the holes initially, but then a digger was used (5 tonne machine) then followed by hand tools again to further excavate the longer of the burrows (none were more than 1.8m in length).

The Offset Site was established by 6 September 2022, and CNBC translocated to it on 9 December 2022.

Plate 1. Works conducted during the establishment of drainage and plants at the River Road Offset Site



B.3 Kings Park Offset Site establishment works

The Offset Site at Kings Park (**Figure 5C**) has several stormwater inputs and is a naturally damp area with shallow topographic depressions adjacent to Kings Creek (so water table is not very deep) and there is opportunity to deepen the existing water pooling areas.

Hand tools (pre-cleaned with F10) were used to excavate the holes initially, but then a digger was used (5 tonne machine) then followed by hand tools again to further excavate the longer of the burrows (none were more than 1m in length).

Plate 2. Works conducted during the establishment of drainage and plants at the Kings Park Offset Site



PART C – SALVAGE AND TRANSLOCATION

The salvage and translocation process was conducted in accordance with the following:

- Operating Procedure – Latrobe Levee Project, Central North Burrowing Crayfish Salvage and Translocation (**Attachment 2**),
- Permit No. DA 22286 (**Attachment 1**).

The exception is the replacement of the section 'CNBC COMPROMISED DURING THE SALVAGE AND EXCAVATION PROCESS' of Attachment 2 with the condition stipulated by Permit No. DA 22286:

> 12. Animals that have injuries from which they are unlikely to recover (e.g. injury to the thorax or head) are to be placed in their own individual container with unchlorinated, fresh water and then placed on ice in a cooler or refrigerator for 2 hours. Animals are then to be euthanised in an ice slurry for 30 minutes.

Four *Engaeus* animals were salvaged and translocated successfully from the impact areas of the Project.

None were euthanised and none died during the salvage and translocation.

The two successfully salvaged and translocated animals from the River Road impact area were positively identified as *Engaeus granulatus* by Dr Colin McCoull.

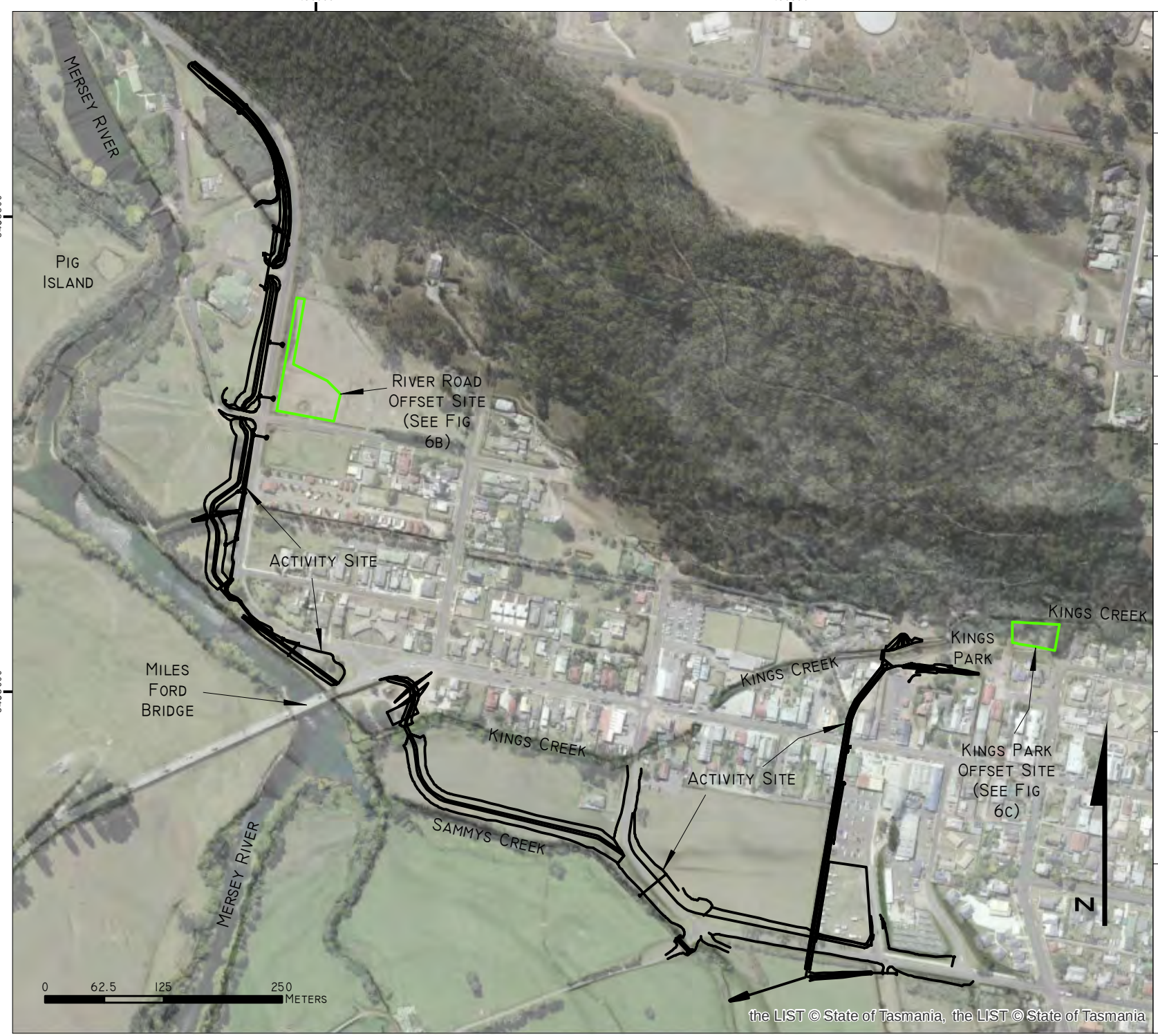
The other two *Engaeus* animals were salvaged from near Victor Street under the Unexpected Discovery Procedure by Treloar Civil and Quarries and BridgePro Engineering – these animals were not identified to species level but are likely to be *Engaeus granulatus*. Excavation works by Treloar's uncovered an unknown culvert system in the paddock to the north of Sammys Creek. The location was not in the impact area at Victor Street and the culvert was not expected to be in that area.

Table 3 provides a summary of the CNBC salvaged and translocated for each of the three impact sites.

Table 3. Central north burrowing crayfish salvaged and translocated in the Project

CNBC Impact Area	CNBC successfully salvaged	CNBC successfully translocated	CNBC euthanised during salvage and translocation	CNBC died during salvage and translocation
River Road	2	2	0	0
Kings Park	0	0	0	0
Victor Street	2	2*	0	0
TOTAL	**4**	**4**	**0**	**0**

* These animals were salvaged and translocated under the Unexpected Discovery procedure (**Attachment 3**) by Treloar Transport and BridgePro staff, so their identification was not conducted.



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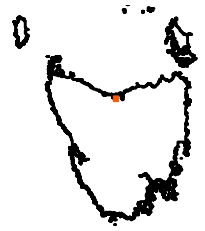
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FIGURE 5A: OFFSET SITE LOCATIONS RELATIVE TO PROJECT INFRASTRUCTURE

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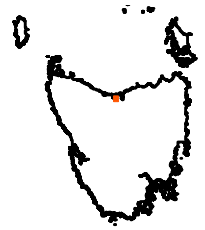
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FIGURE 5B: CENTRAL NORTH BURROWING CRAYFISH TRANSLOCATED TO THE RIVER ROAD OFFEST SITE

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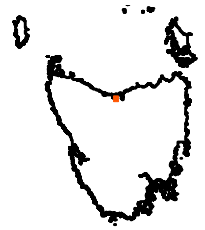
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FIGURE 5C: CENTRAL NORTH BURROWING CRAYFISH TRANSLOCATED TO THE KINGS PARK OFFEST SITE

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C.1 Victor Street

The salvage and translocation process occurred on 6 September 2022 (started at 1630 hrs), and included Dr Colin McCoull and Dr Richard Barnes (both of Van Diemen Consulting Pty Ltd) and a digger operator from Treloar's Transport. All attendees at the site had been inducted, including the EPBC protected matters part of the induction, and a briefing was given at the start of the works to reiterate the presence of the crayfish and their habitat.

Field notes made in my iPhone record it as a cool day, humid, with intermittent cloud cover and no rain or showers. Temperatures were around 12 degrees. Winds were northerly and very light.

The single burrow was located but had become infilled with sediment (flood events and periods of high creek flow) since it was observed and mapped by VDC (2021). No CNBC were salvaged from the burrow, and no additional burrows were located despite searches.

Two *Engaeus* animals were salvaged from **near** Victor Street under the Unexpected Discovery Procedure by Treloar Civil and Quarries and BridgePro Engineering – these animals were not identified to species level but are likely to be *Engaeus granulatus*. Excavation works by Treloar's uncovered an unknown culvert system in the paddock to the north of Sammys Creek. The location was not in the impact area at Sammy's Creek and the culvert was not expected to be in that area. The presence of these animals was solely related to the presence of the culvert which had accumulated water underground. The animals had likely managed to locate and access the culvert from underground burrow connections.

C.2 Kings Park

The salvage and translocation process occurred on Thursday 10 November 2022 (started at 0800 hrs), and included Dr Colin McCoull, Dr Richard Barnes (both of Van Diemen Consulting Pty Ltd, Mr Paul O'Grady (BridgePro) and intermittently Mr Femi Joda and Mr Ben Seymour (both of BP). All attendees at the site had been inducted, including the EPBC protected matters part of the induction, and a briefing was given at the start of the works to reiterate the presence of the crayfish and their habitat.

Field notes made in my iPhone record it as a mild to warm day, humid with rain/showers in the distance. Temperatures were around 18 degrees. Winds were light.

Seven burrows were excavated as they sat within the direct impact area. The same seven burrows were present as those identified in February 2022 (VDC 2021); the burrows removed are those shown in the attached map, and the same as those identified in Fig 11 of the PD. Some burrows coalesced below soil surface level, which is not unexpected as burrows can have multiple-entrances, and equally they can have one entrance but multiple burrows when beneath ground. None were of any great length, with the burrows terminating at gravelly sediments in an otherwise alluvial profile or the basement compacted clay layer. The sporadic and densely gravelly nature of the soil profile, and basement clay layer indicates that the habitat was not of very high value as it would like to quickly dry out during dry periods (especially when the creek is not flowing) without any possibility for animals to seek greater depth to follow the water table.

A further 6 burrows (identified in the February 2022 PD maps), outside the project area, may be indirectly impacted at some stage during the operation of the infrastructure - this was communicated in the PD and the potential impact to burrow number and potential habitat offset (i.e., it was assumed that there would be complete and irreversible loss to the full 13 burrows and the full area of potential impact; this was to be conservative in determining an offset).

No salvage/translocation works were done outside the project area.

C.3 River Road

The salvage and translocation process occurred on 7, 8 and 9 December 2022 and included Dr Colin McCoull and Dr Richard Barnes (both of Van Diemen Consulting Pty Ltd) and a digger operator from Treloar's Transport. All attendees at the site had been inducted, including the EPBC protected matters part of the induction, and a briefing was given at the start of the works to reiterate the presence of the crayfish and their habitat.

Plate 3 shows some of the excavation works conducted to salvage CNBC from the impact area.

Field notes made in my iPhone record temperatures around 13 to 19 degrees during the day when salvage works were being conducted. Winds over the salvage period were westerly, northerly, north-westerly, and south-westerly; wind speeds were generally mild to light. No rain occurred during the excavation and salvage period.

Of the 47 burrows observed and recorded by VDC (2021) only 18 were clearly observable when the salvage process commenced. These burrows were all without a chimney (see **Plate 4**) and only 4 showed any signs of use or recent use based on the presence of mud that had clearly been excavated post-sediment inundation of burrows.

Plate 3. Salvage and translocation works at the River Road impact area













Late winter into spring saw heavy and sustained rainfalls for the area and upper catchment of the Mersey River. A major flood event occurred in October 2022 which was caused by very heavy rainfall in the upper catchment of the Mersey River on already saturated ground and full dam/river systems. Rainfall records at Sheffield School Farm (**Plate 5**) which is in the upper Mersey River catchment show October 2022 as a very high rainfall period, most of which fell during a rainfall even in late October. Other months were also well-above average, and this was mirrored in lower catchment locations including Latrobe.

The outcome of the flood and the high rainfall events appears to be the infilling of many of the burrows observed by VDC (2021) with sediment. The mud-like sediment was very sticky and occurred sporadically in the burrows, with some burrows not being able to be located until the top surface had been scalped – even then, some burrows were only evident by the sticky-mud which was a contracts to the otherwise dark to black clay. Also of note was the presence of vegetation and plastic debris in the burrows being excavated.

Plate 4. Burrows in the River Road impact area



Plate 5. Mean monthly rainfall and monthly rainfall for 2022 at Sheffield School Farm

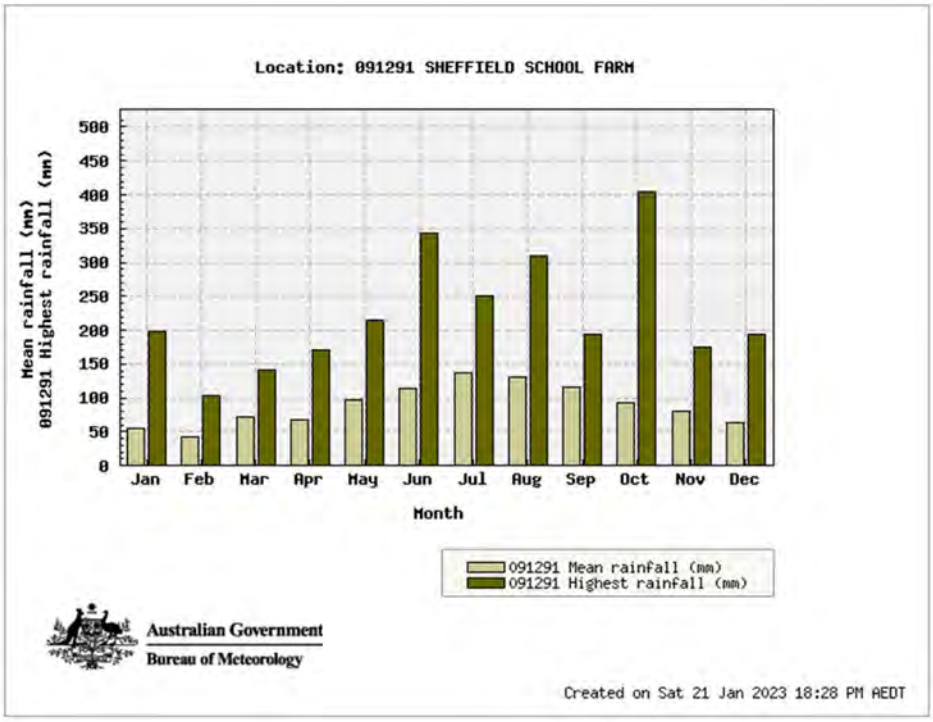


Plate 6 provides some images of the hard grey to black clay that formed the basement geology. An image is also provided of the lighter coloured sticky mud that is a sharp contracts to the dark grey to black clay and clay loam in which it occurs as bands. The sticky light coloured grey mud is dense and fills many of the burrows.

Some burrows coalesced below soil surface level, which is not unexpected as burrows can have multiple-entrances, and equally they can have one entrance but multiple burrows when beneath ground. None were of any great length, with the burrows terminating at very hard (compacted) dark grey to black clay. The shallow basement clay layer indicates that the habitat present was not of very high value as it would like to quickly dry out during dry periods (especially when the drain is not flowing) without limited possibility for animals to seek greater depth to follow the water table. Notwithstanding this, active burrows were observed downstream in the drain near the footpath crossing the drain and nearer to the car park and barbecue area of Belles Parade. However, the number of observable burrows downstream of the works area was significantly less than 10% of the number observed by VDC (2021). It is likely that the same fate has befallen those burrows and their occupants as those in the Project impact areas.

The infilling of the burrows by the sticky fine clay sediment and the consequential death or movement by CNBC from the impacted area is not related to the Project and the works it had done to that point – no excavation works at all had occurred in the River Road section of the Project Area.

Plate 6. Ground conditions at the River Road Offset Site





The basement geology is a compacted hard grey to black clay. No burrows were observed to penetrate into this layer.



Narrow bands of sticky grey mud with some organic (fresh) debris, such as grass and plant leaf fragments, and plastics (mainly thin plastic wrappers).

The image to right identifies the mud (yellow arrows) where a CNBC was located during the salvage process.



The October 2022 flood and its impact on burrows is, in our view, the primary cause of low numbers of CNBC salvaged at the River Road site. It is unknown if the CNBC (or other *Engaeus* species) that may have been present in the burrows prior to the flood departed their burrows, or whether they were impacted and succumbed to the siltation of their burrows where they perished. No corpses or body parts (which are hard and should persist after death, especially death by encapsulation in a burrow from sediment) were found during the excavation process, which does suggest the animals fled prior to or during the catastrophic sediment event of the October 2022 flood.

Of note is that the other sites where Drs McCoull and Barnes have salvaged CNBC have not been subjected to catastrophic flood events – they were roadside drains on higher ground or drainage slopes where vulnerability to flooding is very low to negligible. Flooding in downstream habitats of the species, such as the broader valley flats of the major river systems on which it occurs such as the Mersey and Don Rivers may represent a significant threat to localised populations and occurrences of the species. Only some if any animals may survive, and the local population may need to recover from the few that survive or other animals disperse into these habitats that have been vacant or only sparsely occupied. While not directly related to the salvage and translocation process, it is an observation of relevance to the species and its management, and an explanation as to why fewer than expected animals were located and salvaged.

No salvage/translocation works were done outside the project area.

PART D – REFERENCES

Van Diemen Consulting Pty Ltd (2021). Ecological AND Natural Values Assessment – Latrobe Levee Project. October 2021.

ATTACHMENTS

Attachment 1. Threatened Species Permit – DA22286

DEPARTMENT of NATURAL RESOURCES and ENVIRONMENT

PERMIT TO TAKE THREATENED FAUNA

Permit No. DA 22286

Issued in accordance with Regulation 4 of the Threatened Species Protection Regulations 2016 and Section 29 of the Nature Conservation Act 2002

Inquiries : Michelle Richardson
Phone : 616 54418
Our Ref. : D22-109425
Email : Michelle.Richardson@nre.tas.gov.au

Jonathan Magor
Manager Infrastructure & Assets
Latrobe Council
170 Gilbert Street
Latrobe TAS 7307

is authorised to take

(for the purpose of salvage and translocation) up to 66 *Engaeus granulatus* (Central North Burrowing Crayfish) including their burrows

from

River Road, Kings Park and Victor Street in Latrobe - as shown in Schedule 3

for

the purpose of constructing flood mitigation measures around the township of Latrobe

subject to the conditions in Schedule 1 (overleaf)

This authority is valid only from 13/04/2022 to 12/04/2026

Issued by:

Date: 12/04/2022

Michelle Richardson

Delegate of the Secretary of the Department of Natural Resources and Environment Tasmania

DEPARTMENT of NATURAL RESOURCES and ENVIRONMENT

PERMIT TO TAKE THREATENED FAUNA

Permit No. DA 22286

Issued in accordance with Regulation 4 of the Threatened Species Protection Regulations 2016 and Section 29 of the Nature Conservation Act 2002

SCHEDULE 1 Conditions of Permit

1. This permit does not constitute permission to enter land. Permission must be obtained from landowners or land managers prior to entering their land to take the threatened fauna and products of wildlife specified on this permit..

2. This permit must be carried while taking the threatened fauna and products of wildlife specified on this permit and shown to an authorized officer on request.

3. Only the permit holder and those persons listed in Schedule 2 are authorised to take the threatened fauna and products of wildlife specified on this permit.

4. Habitat creation and enhancement, and translocation of the specified threatened fauna must be carried out in accordance with the Offset Management and Monitoring Plan (OMMP) as approved by the Commonwealth Department of Agriculture, Water and Environment (DAWE), except where prescribed otherwise in this permit.

5. Collection and handling of the threatened fauna specified on this permit is to be undertaken by, or under the direct supervision of, a suitably qualified and experienced person. Injury or killing of the specified threatened fauna must be avoided or minimised.

6. Animals from River Road and Victor Street must be relocated to the River Road offset site and animals from Kings Park must be relocated to the Kings Park offset site - as shown in Schedule 3.

7. Habitat creation and enhancement works at the Kings Park offset site are to occur in the following manner: earthworks must be undertaken at a minimum 14 days prior to translocation and plantings must be undertaken at a minimum 7 days prior to translocation.

8. Habitat creation and enhancement works (earthworks and plantings) at the River Road offset site are to occur at a minimum two months prior to the translocation.

9. Horses must be excluded from the River Road offset site prior to the translocation of any crayfish.

10. Salvaged animals are to be placed in their own individual storage jar (each jar should be of sufficient size to contain the animal but limit their movement within the jar) containing local, fresh, unchlorinated water.

11. Animals must be placed in artificial burrows at the translocation sites at a density of no more than three (3) individuals per square meter.

12. Animals that have injuries from which they are unlikely to recover (e.g. injury to the thorax or head) are to be placed in their own individual container with unchlorinated, fresh water and then placed on ice in a cooler or refrigerator for 2 hours. Animals are then to be euthanised in an ice slurry for 30 minutes.

13. Dead animals are to be placed into preserving jars containing 90% ethanol for preservation and be offered to an appropriate institution (such as the Queen Victoria Museum, Launceston) as soon as practicable.

14. A copy of all reporting that is required by the Commonwealth and that is due before or at the expiration of this permit must be provided concurrently to the Conservation Assessment and Wildlife

Management Section (CAWM), NRE Tas, by emailing ConservationAssessments@nre.tas.gov.au.

15. CAWM must be notified in writing within 30 days of the completion of works or expiration of the permit, whichever is the sooner. Details of threatened fauna and products of wildlife taken, or the area taken, along with the date and location of the works undertaken that directly impacted the threatened species must be entered into the Permit Activity Report Form (the form) attached in Schedule 4, and the form returned to ConservationAssessments@nre.tas.gov.au.

SCHEDULE 2 The following people are joint holders of this permit

Employees and sub-contractors of BridgePro Engineering Pty Ltd, 19 Faulkner Drive, Latrobe, TAS 7307
Paul Ellery, Project Superintendent, Latrobe Council 170 Gilbert Street, Latrobe TAS 7307
Michael Luttrell, Project Manager, Shaw Level 1, EXA House, 73 Paterson Street Launceston TAS 7250
Chris Treloar and John Treloar, Treloar Transport, 5 Spring St, Sheffield TAS 7306
Richard Barnes and Colin McCoull, Van Diemen Consulting Pty Ltd, PO Box 171 New Town TAS 7006

Tasmanian Government

DA 22286 SCHEDULE 3 – MAP

Construction of flood mitigation measures for Latrobe

Map 1: Overview of Latrobe with approximate location of take areas shown in blue

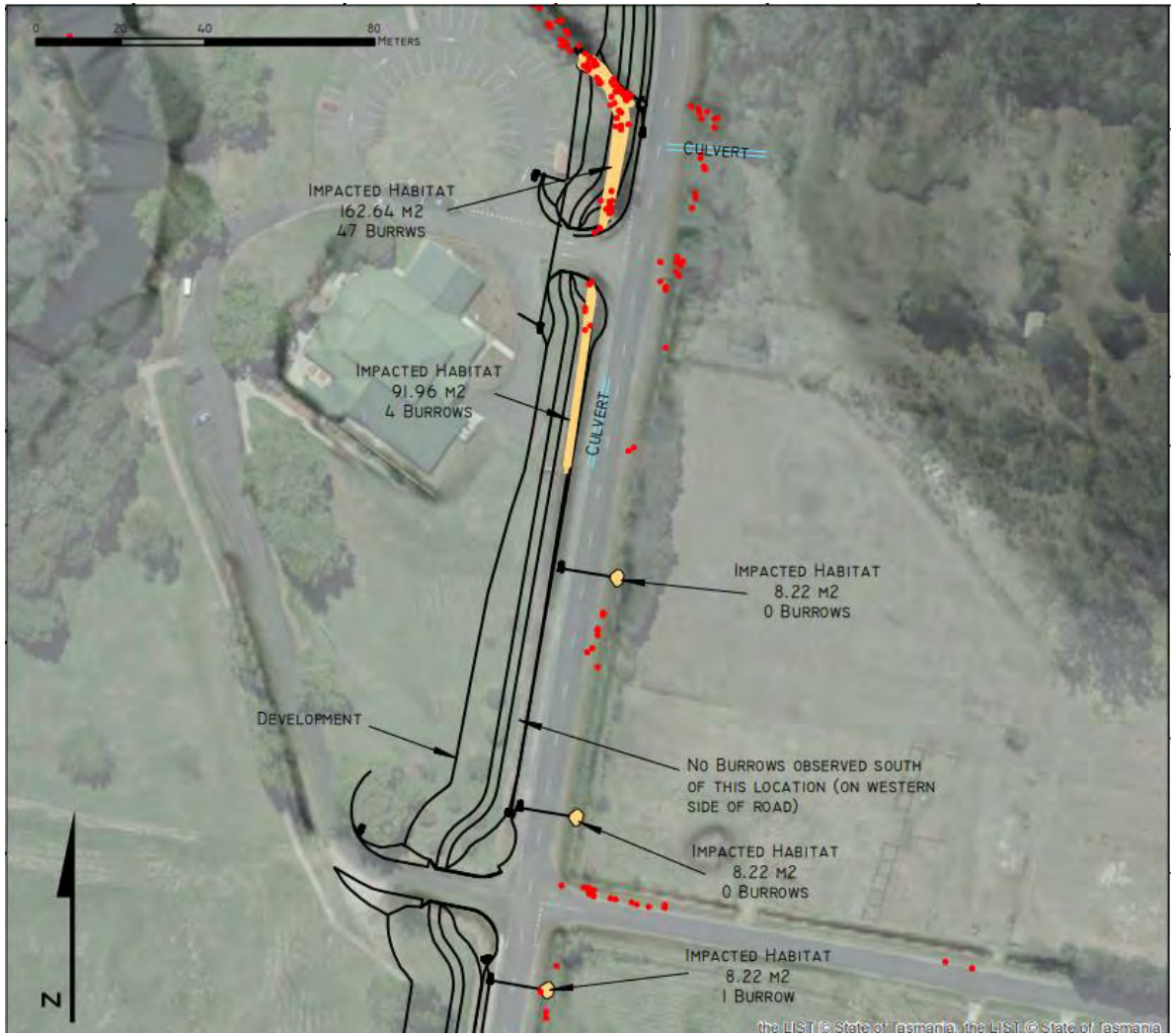


Tasmanian Government

DA 22286 SCHEDULE 3 – MAP

Construction of flood mitigation measures for Latrobe

Map 2: Close-up of take area – River Road



Tasmanian Government

DA 22286 SCHEDULE 3 – MAP

Construction of flood mitigation measures for Latrobe

Map 3: Close-up of take area – Kings Park



Tasmanian Government

DA 22286 SCHEDULE 3 – MAP

Construction of flood mitigation measures for Latrobe

Map 4: Close-up of take area – Victor Street

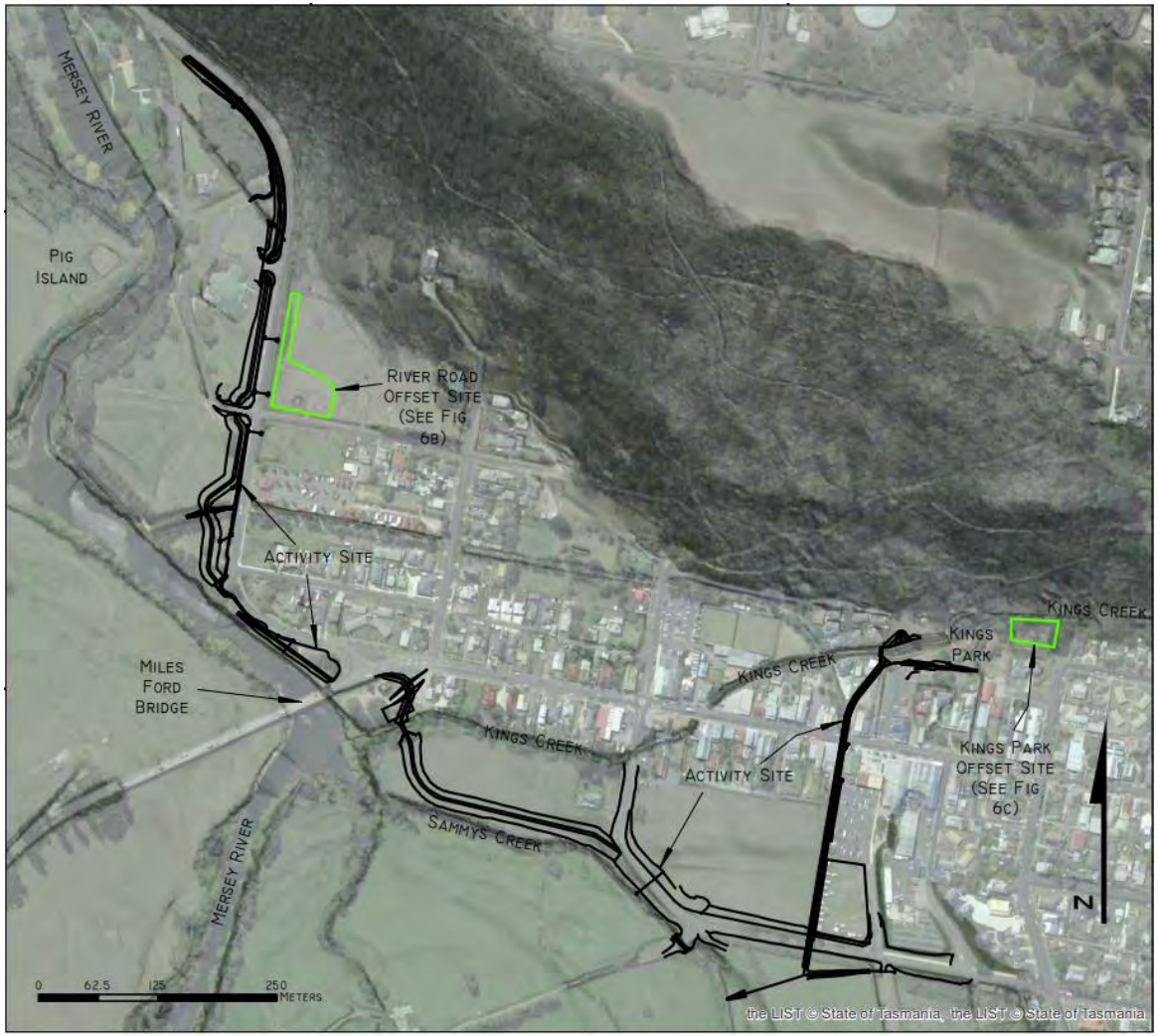


Tasmanian Government

DA 22286 SCHEDULE 3 – MAP

Construction of flood mitigation measures for Latrobe

Map 5: Location of the translocation sites – River Road and Kings Park



Attachment 2. Operating Procedure – Latrobe Levee Project, Central North Burrowing Crayfish Salvage and Translocation



OPERATING PROCEDURE – LATROBE LEVEE PROJECT

CENTRAL NORTH BURROWING CRAYFISH SALVAGE AND TRANSLOCATION

ENVIRONMENTAL MANAGEMENT OVERVIEW

This Operating Procedure (OP) provides an overview of the environmental management objectives and procedures to salvage and translocate *Engaeus granulatus* as part of the Latrobe Levee project**.**

This OP must be read in conjunction with the *Offset Management and Monitoring Plan*.

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
LC	Latrobe Council
OMMP	Offset Management and Monitoring Plan
OP	This Operating Procedure

Terms

Work Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Contractor	The company/entity engaged to perform the Project
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: Kings Park and River Road.
Project	The Latrobe Levee Project

OBJECTIVE

To maximise the number of Central North burrowing crayfish (*Engaeus granulatus*) successfully salvaged and translocated from the Work Area to the Offset Sites.

TARGETS

- No impact to threatened flora and fauna species (except Central North burrowing crayfish, CNBC) at and near the Work Area beyond that anticipated at the design phase of the Project.
- Maximum number of CNBC successfully salvaged and translocated from the Work Area to the Offset Sites.
- Minimal mortality of CNBC during the excavation and salvage process.

RESPONSIBILITIES

Except for when the LC is the permit holder, LC has a responsibility to sight the necessary permits from the Contractor before they engage the Contractor to conduct the salvage and translocation works.

The Contractor is responsible for applying any conditions associated with permits issued to conduct the translocation of CNBC. Only suitably qualified Contractor's that can lawfully perform the tasks and duties of this OP will be engaged by LC.

PERMITS

Any specific conditions contained in permits obtained for the Project must be strictly adhered to.

PROCEDURES

OFFSET SITE ESTABLISHMENT

- The Offset Sites must have been prepared to receive the salvaged CNBC prior to the commencement of CNBC in the Work Area. The Offset Site establishment process is described in the *Offset Management and Monitoring Plan*.
- Salvage and translocation should occur when soils at the Work Area and Offset Sites are sufficiently moist/damp. CNBC are more likely to be closer to the surface allowing easier excavation of burrows and new burrows can be easily established at the Offset Sites.
- Translocation should be avoided during spring/summer when crayfish are breeding, and juveniles have not yet dispersed. If translocation cannot be avoided during this time, then a supplementary watering system must be installed to establish and maintain favourable soil moisture conditions until natural rainfall provides sufficient moisture to the Offset Sites.

PREPARATION FOR CNBC SALVAGE

- At least 7 days prior to the salvage and translocation of CNBC, a suitable CNBC translocation area in each Offset Site will be identified on-ground by a suitably qualified ecologist using steel droppers (fitted with safety caps) and orange plastic (safety-style) fencing.
- Holes will be created in that area into which CNBC can be placed (at least 30 at the start of the salvage and translocation process, more can be made if required).
- Holes should be no less than 20 cm apart and should be dug to the water table if possible or, at the least, wet/damp sub-soil using a screw-type auger or similar. Holes will be at least 1 inch wide (25 mm) and partially filled with dechlorinated potable water if the water table is not reached during the hole creating process.

SALVAGE AND EXCAVATION PROCESS

- All site workers at the site induction are to be made aware of the conditions of the permits and environmental aspects of the Project.
- A suitably qualified ecologist is to mark with flagging tape or survey marker paint the boundary of the Work Area (there are three locations – River Road, Kings Park and Sammy's Creek) which is to be excavated to salvage CNBC.

- Hand tools (e.g., trowel, spade, shovel etc) are to be cleaned in F10 (a disinfectant) will be used as the main means to excavate CNBC from the Work Area.
- On the advice of a suitably qualified ecologist, an excavator may be used to excavate those areas where hand tools are impractical (e.g., deep burrows, confined space, danger of drain collapse). The suitably qualified ecologist will establish with the excavator operator(s) the process of excavation (e.g., decide on hand signals for directions, timing of excavation and direction within the drains, direction of excavation, technique of excavation and depth (to minimise risk of injury to CNBC)).
- Only persons authorised by LC and with the necessary cover of a permit from DPIPWE will handle CNBC.
- CNBC once recovered will be –
    - examined to check that they have not been compromised by the excavation process.
    - washed free of dirt and mud from the excavation site by placing them into a container of dechlorinated potable water (tap water that has been allowed to sit in a vented container for at least 72 hours).
    - cleaned in a second container of dechlorinated potable water.
    - identified to species level (to confirm the animal is CNBC, and if it is not, which species of *Engaeus* it is) and placed into a plastic container with dechlorinated potable water and covered with a lid with a few air holes. Containers will be stacked into an Eski (or similar) with ice in the base covered by a folded towel.
    - When 15 animals have been salvaged, or if 1.5 hours has passed since the first held CNBC was salvaged, whichever occurs first, then the held salvaged CNBC will be introduced to the Offset Sites.

INTRODUCTION TO OFFSET SITES

- CNBC will be placed tail first into the pre-prepared holes (only one crayfish placed in each created hole) and marked with a weed mat stake marked with flagging tape (pink or blue).
- A sketch 'map' of the Offset Sites will be prepared post-translocation of all the salvaged CNBC noting the: -
    - Any pre-existing likely occupied burrows;
    - burrows inhabited by injured, but not compromised, animals (e.g., one front claw missing); and
    - burrows occupied by gravid females (if present).

CNBC COMPROMISED DURING THE SALVAGE AND EXCAVATION PROCESS

- Compromised CNBC, in the opinion of a suitably qualified person, may include CNBC that have lost both front claws (but not animals that retain one front claw unless they have other injuries), have sustained an injury to their thorax, head or abdomen from which they are unlikely to recover or are only partially complete (e.g., have been decapitated or cut in half by the excavation process). These

CNBC are to be: -

- Euthanised in a solution of MS22 or AQUI-S until such time they are deemed to be dead (any leftover solution will be disposed of in accordance with the manufacturer's directions);
- Placed into preserving jars containing 90% ethanol for preservation: and
- Specimens offered to a research institution (on advice from DPIPWE) such as the Tasmanian Museum and Art Gallery (TMAG), Queen Victoria Museum and Art Gallery (QVMAG), or University of Tasmania (Utas) for addition to any existing collection for future research opportunities.

MONITORING

It is important that the success or otherwise of the project be assessed against key criteria. Monitoring is described in the *Latrobe Levee Project Offset Management and Monitoring Plan*.

RECORDS

Written records and field notes must be provided to LC for future reference and reporting to regulatory authorities if required.

Written and photographic records of the salvage and translocation process must be kept by the Contractor, including: -

- the date of excavation works, weather conditions, the names of persons involved in the excavation process;
- the number of animals (alive and intact) salvaged/excavated and translocated; and
- the number of animals euthanised and preserved.

The date and time of notification to the Contractor of any failure to implement site specific management requirements.

Directions given to the Contractor by the LC Superintendent to fix any identified issues and the timeframe within which they should complete the remedial works.

Attachment 3. UNEXPECTED DISCOVERY SALVAGE AND TRANSLOCATION – Central North Burrowing Crayfish

OPERATING PROCEDURE – LATROBE LEVEE PROJECT

UNEXPECTED DISCOVERY SALVAGE AND TRANSLOCATION – Central North Burrowing Crayfish

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This Operating Procedure (OP) provides an overview of the procedure to salvage and translocate *Engaeus granulatus* **unexpectedly discovered** during earthworks as part of the Latrobe Levee project**.**

This OP must be read in conjunction with the *Offset Management and Monitoring Plan* and is based on conditions contained with the threatened species permit issued by the Department of Natural Resources and Environment - DA 22286.

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
LC	Latrobe Council
OMMP	Offset Management and Monitoring Plan
OP	This Operating Procedure

Terms

Work Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Contractor	The company/entity engaged to perform the Project
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: Kings Park and River Road.
Permit	The threatened species permit issued by the Department of Natural Resources and Environment - DA 22286
Project	The Latrobe Levee Project

OBJECTIVE

To manage (by salvage and translocation) the **unexpected discovery** of Central North burrowing crayfish (*Engaeus granulatus*) during earthworks associated with the Latrobe Levee Project.

REQUIRED EQUIPMENT

The following should be available at the Site Office (Cotton Street):

- Plastic takeaway containers.
- Gloves (e.g., kitchen or garden gloves) to handle the crayfish while translocating it.

PROCEDURE

- Only persons authorised by the Permit will handle CNBC.
- CNBC once recovered will be –
    - examined to check that they have not been compromised such that survival is not likely (e.g., animal cut in half or lost a portion of its carapace or abdomen). See image below of a crayfish after salvaging, and when placed into container with water.
    - placed in their own individual storage container that has locally sourced, fresh, unchlorinated water (e.g., water from Kings Creek or Sammys Creek).
    - taken to the Offset Site and placed tail first into the pre-prepared holes (only one crayfish placed in each created hole) and marked with a weed mat stake marked with flagging tape (pink or blue).
    - A photo of the hole and surrounding area will be taken.

Burrowing crayfish pictured immediately after being salvaged from excavated soil



- Animals that have injuries from which they are unlikely to recover (e.g., injury to the thorax or head) are to be placed in their own individual container (see image above) with **unchlorinated, fresh water** and then placed on ice in a cooler or refrigerator for 2 hours. Animals are then to be euthanised in an ice slurry for 30 minutes.
- Dead animals are to be placed into preserving jars containing 90% ethanol for preservation and Van Diemen Consulting (VDC, Richard Barnes – 0438 588 695) notified.

Burrowing crayfish in plastic container covered with water ready for translocation



MONITORING

It is important that the success or otherwise of the project be assessed against key criteria. Monitoring requirements are described in the *Latrobe Levee Project Offset Management and Monitoring Plan*.

RECORDS

Written records and field notes must be provided to LC and VDC for future reference and reporting to regulatory authorities if required.

Written and photographic records must be kept by the Contractor, including: -

- the date of the unexpected discovery,
- the number of animals (alive and intact) salvaged/excavated and translocated, and
- the number of animals euthanised and preserved.

Attachment 4. Latrobe Levee Project - Latrobe Levee Project – Indirect Impact Monitoring

INDIRECT IMPACT MONITORING PROCEDURE – LATROBE LEVEE PROJECT

CENTRAL NORTH BURROWING CRAYFISH

PURPOSE

This Procedure outlines the methods to monitor for post-construction indirect impact to burrows and habitat of CNBC downstream of proposed works areas – River Road to Bells Parade, Sammy's Creek and Kings Creek.

This Procedure must be read in conjunction with the *CNBC Offset Management and Monitoring Plan*.

Acronyms

CNBC	Central north burrowing crayfish (*Engaeus granulatus*)
LC	Latrobe Council
OMMP	CNBC Offset Management and Monitoring Plan

Terms

Work Area	The land upon which the following will occur: the construction of permanent levees around the township's south-western and southern perimeter (including the use and subsequent rehabilitation of laydown areas, office site and construction corridor), flood gates and a peak-flow diverter system on Kings Creek at Kings Park to divert peak flood flows to Sammy's Creek.
Offset Sites	The designated sites where salvaged CNBC will be translocated. There are two sites: Kings Park and River Road.
Project	The Latrobe Levee Project

OBJECTIVE

- To determine if there is or has been a Project caused impact to CNBC burrows and habitat downstream of the Work Area post-construction of the Project.

TARGETS

- No Project caused impact to CNBC burrows and habitat downstream of the Work Area post-construction of the Project.

RESPONSIBILITIES

Except for when the LC is the permit holder, LC has a responsibility to sight the necessary permits from the Contractor before they engage the Contractor to conduct the salvage and translocation works.

LC is responsible for reporting the findings of the monitoring to the relevant authorities.

PERMITS

Any specific conditions contained in permits obtained for the Project must be strictly adhered to.

MONITORING

Locations

A suitably qualified ecologist will select areas within the three indirect impact areas (Figure 5).

Areas will be selected based on CNBC being present and, in a density, greater than 0.2 burrows/m^2. Selected sites will be suitably tagged/identified for future reference

.

Parameters and Frequency

Table 1 provides the parameters to be monitored including their respective method and frequency. Monitoring is unlikely to be needed after 3 years as any indirect impact caused by the Project post-construction should be evident by then.

Table 1. Monitoring parameter and frequency for selected indirect impact areas post-construction

Parameter	Tasks	Frequency	Qualification to conduct task
Burrow number	Burrow count and assessment of activity/life history traits Photopoints	1, 36 and 52 weeks after practical completion then once every 12 months for 3 years.	Suitably qualified ecologist
Erosion and/or sedimentation	Photopoints	1, 36 and 52 weeks after practical completion then once every 12 months for 3 years.	Suitably qualified ecologist

Trend assessment

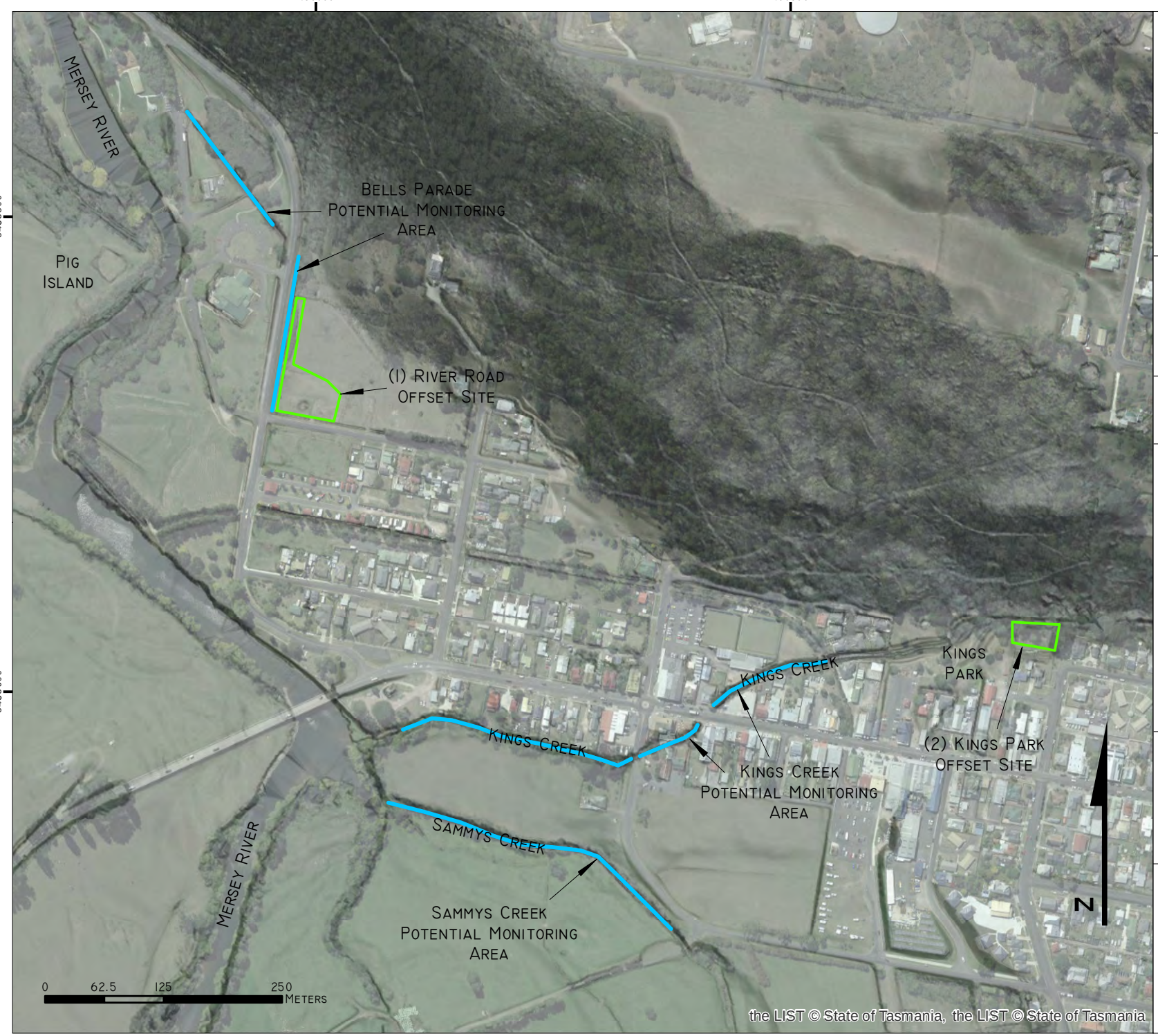
A suitably qualified ecologist will consider the results obtained from the monitoring at no later than the third event (being at the conclusion of week 52 from practical completion) to determine if there are any trends evident. Trends may include a reduction in vegetative cover, increase in vegetative cover, reduction in burrow number or increase in burrow number, additional or loss of soil and gravel from an area, etc. The trends may be different at each of the locations or between sites within each location.

In the very unlikely event that there is a loss of burrows then consideration will need to be given to the reasons why, and if those reasons appear to be related to the installation of the Project, then advice will be sought from the DAWE about the need for further offsets to compensate for that impact.

RECORDS

Written records and field notes must be held by LC for reporting to regulatory authorities.

Results must be reported within the Annual Report.



LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

FIGURE 5: INDIRECT IMPACT MONITORING LOCATIONS FOR CNBC BURROWS AND HABITAT

TASMAP:	LGA:
LATROBE	LATROBE

BASE DATA BY TASMAP. © STATE OF TASMANIA
BASE IMAGE BY TASMAP. © STATE OF TASMANIA

Van Diemen CONSULTING
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT:
BRIDGE PRO
PTY LTD AND
LATROBE COUNCIL

DATE: 28 NOV 2021

Attachment 2. Photopoint pictures

SITE 1

LOOKING WESTWARDS TOWARDS RIVER ROAD



SITE 2

LOOKING EASTWARDS ALONG LAST STREET WEST



SITE 2

LOOKING NORTHWARDS ALONG RIVER ROAD



SITE 3

LOOKING SOUTHWARDS ALONG RIVER ROAD



SITE 4

LOOKING NORTHWARDS ALONG RIVER ROAD



SITE 5

LOOKING EASTWARDS ALONG LAST STREET WEST



SITE 6

LOOKING NORTHWARDS ALONG RIVER ROAD



SITE 6

LOOKING SOUTHWARDS ALONG RIVER ROAD



SITE 6

LOOKING NORTHWARDS ALONG RIVER ROAD



SITE 7

LOOKING TOWARDS CULVERT



SITE 7

LOOKING SOUTHWARDS



SITE 8

LOOKING WESTWARDS



SITE 8

LOOKING EASTWARDS



SITE 9

LOOKING EASTWARDS



SITE 9

LOOKING WESTWARDS



SITE 10

LOOKING EASTWARDS



SITE 11

LOOKING EASTWARDS



SITE 11

LOOKING WESTWARDS



SITE 12

LOOKING EASTWARDS



SITE 12

LOOKING WESTWARDS



SITE 13

LOOKING EASTWARDS



SITE 14

LOOKING EASTWARDS



SITE 14

LOOKING WESTWARDS



SITE 15

LOOKING EASTWARDS



SITE 15

LOOKING WESTWARDS



SITE 16

LOOKING EASTWARDS

