

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
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Acronyms

CNBC	Central north burrowing crayfish (<i>Engaeus granulatus</i>)
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 Statement¹ '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 actions² 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 Documentation³.

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 m² of CNBC suitable habitat be created at River Road (1,845 m²) and Kings Park (485 m²) 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 endangered⁴ 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 species⁵, 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:

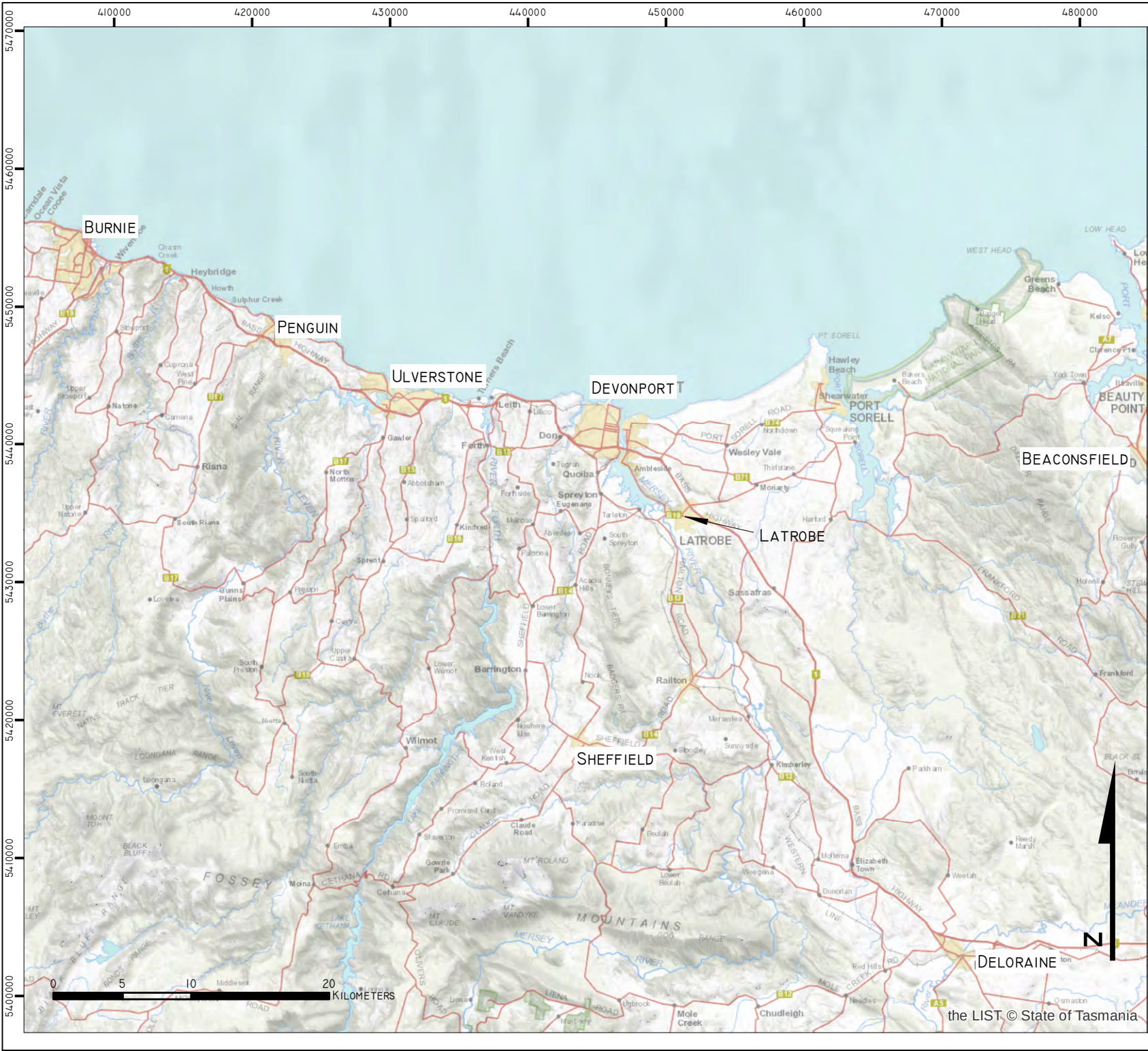
- Describe the method of salvage and translocation of CNBC from the Impact Areas to the Offset Sites,
- Outline the methods to create the proposed 2,330 m² of CNBC suitable habitat at River Road (1,845 m²) and Kings Park (485 m²) in a manner consistent with the EPBC Act Environmental Offsets Policy – the minimum required offset is 2,050 m² 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 2008⁶), 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.



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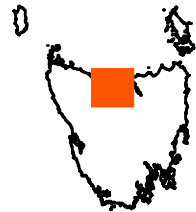
FIGURE I: LOCATION OF
LATROBE TOWNSHIP IN
CENTRAL NORTH TASMANIA

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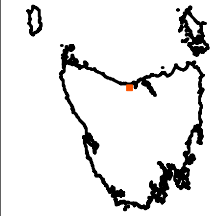
FIGURE 2: LOCATION OF LATROBE TOWNSHIP SHOWING KEY LOCATIONS AND FEATURES

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- PERMANENT INFRASTRUCTURE (I.E. LEVEE, GATES & CULVERTS)
- TEMPORARY INFRASTRUCTURE (I.E. OFFICE & LAYDOWN AREAS)

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

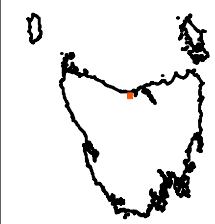
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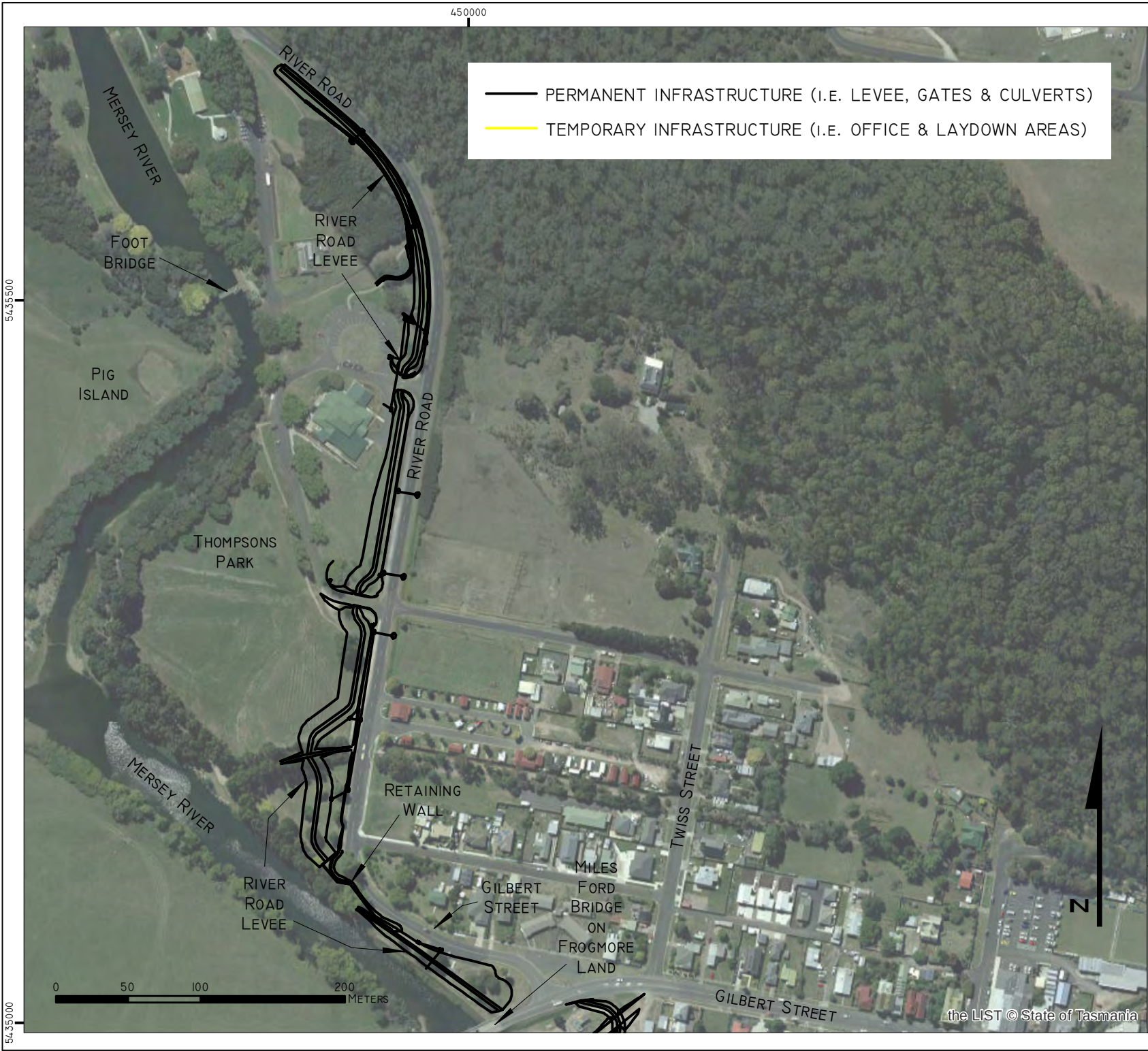
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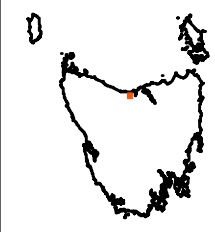
FIGURE 3B: PROJECT INFRASTRUCTURE IN NORTH-WESTERN SECTION AND LOCATIONS

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- TEMPORARY INFRASTRUCTURE (I.E. OFFICE & LAYDOWN AREAS)

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

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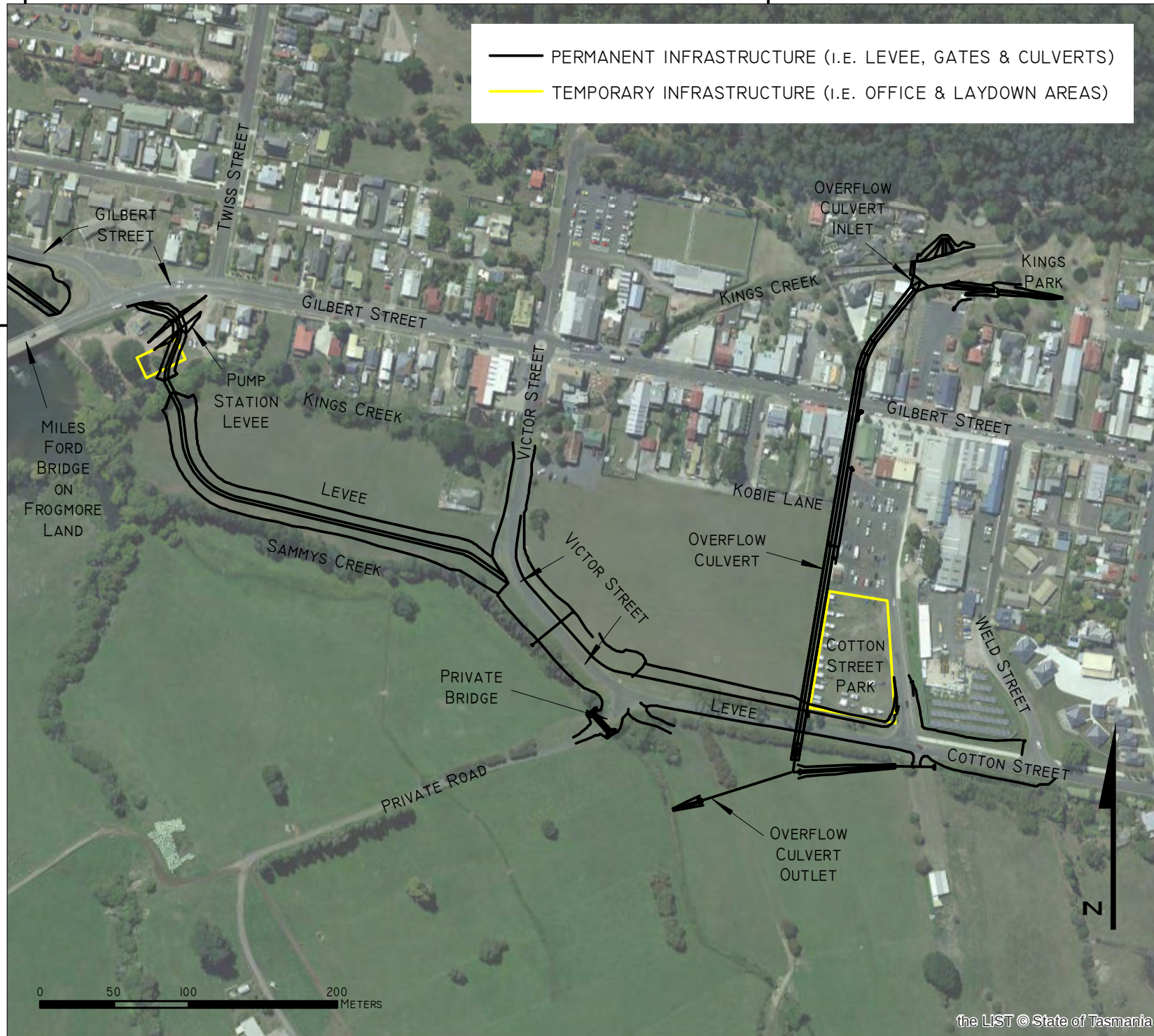
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A.4 Offset Site security, and management and reporting responsibilities

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 granulosus*) 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

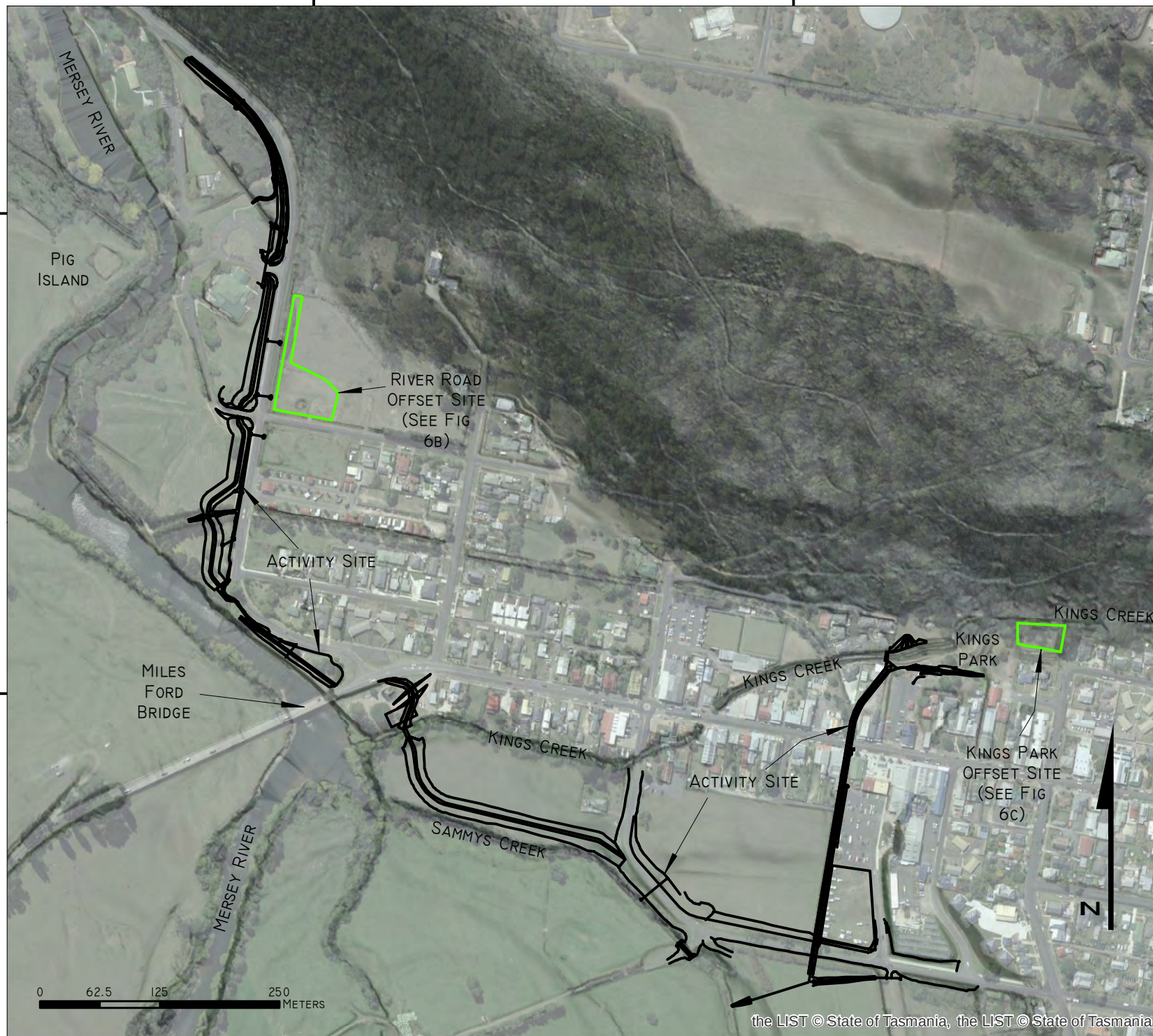
Attribute	Offset Site 1	Offset Site 2
Reference Name	River Road Offset Figure 4B	Kings Park Offset Figure 4C
Physical Address	RIVER RD LATROBE TAS 7307	HAMILTON ST LATROBE TAS 7307
Access	Last Street West	Kings Lane and Kings Park
Certificate of Title (PID)	223225/1, 153484/1, 46134/7, 233419/1 (3170515)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

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FIGURE 4A: OFFSET SITE LOCATIONS RELATIVE TO PROJECT INFRASTRUCTURE

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

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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	<i>Eucalyptus ovata</i>	Tree	1 per 100m ²
Blackwood	<i>Acacia melanoxylon</i>	Large shrub to tree	1 per 100m ²
Swamp paperbark	<i>Melaleuca ericifolia</i>	Large shrub to tree	1 per 50m ²
Manuka	<i>Leptospermum scoparium</i>	Large shrub	1 per 5-10m ²
Cutting sedge	<i>Carex appressa</i>	Sedge	1 per 5m ²
Tassel sedge	<i>Carex fascicularis</i>	Sedge	1 per 5m ²
Tussock grass	<i>Poa labillardierei</i>	Tussock forming grass	1 per 5m ²
Pale rush	<i>Juncus pallidus</i>	Tall rush	1 per 20m ²
Knobbly rush	<i>Ficinia nodosa</i>	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	<i>Carex appressa</i>	Sedge	1 per 5m ²
Tassel sedge	<i>Carex fascicularis</i>	Sedge	1 per 5m ²
Tussock grass	<i>Poa labillardierei</i>	Tussock forming grass	1 per 5m ²
Pale rush	<i>Juncus pallidus</i>	Tall rush	1 per 20m ²
Knobbly rush	<i>Ficinia nodosa</i>	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.

Time over which loss is averted

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/m² to 0.09 burrows/m². 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/m² for undisturbed habitat and 0.05/m² 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**.

Confidence in result (%)

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/m² for undisturbed habitat and 0.05/m² for disturbed habitat (Nelson 2003). For the Activity Site, burrow densities were observed at the three impact locations – • River Road – 0.09/m² • Kings Park – 0.04/m²	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/m² 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/m² 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 from 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

LAND USE	OFFSET SITE	
	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

ITEM	RIVER ROAD		KINGS PARK	
	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		
	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			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 m² 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 <i>Open Space</i> 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.

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 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*

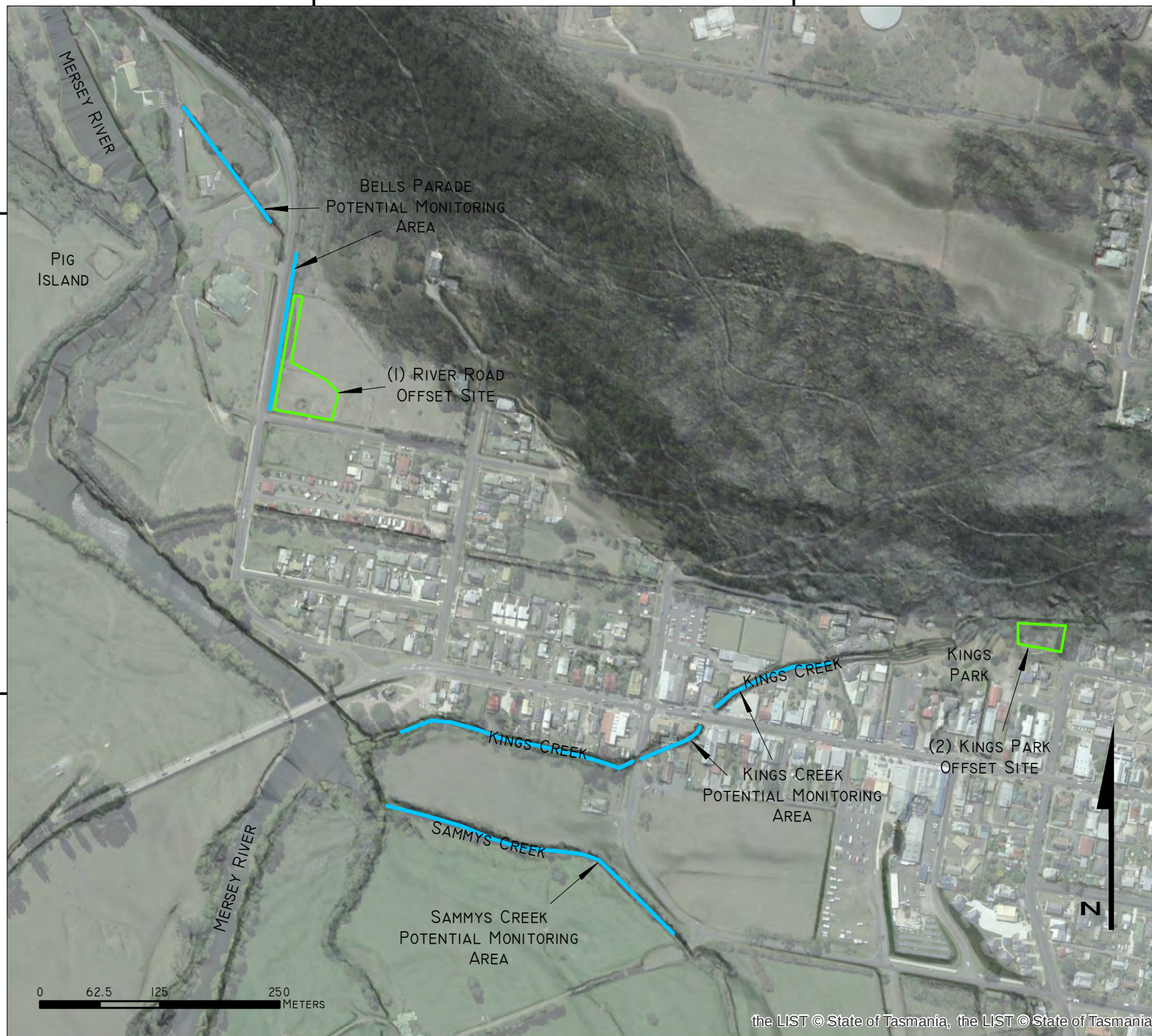
Indirect impacts will be quantified over time from baseline data (collected when the Offset Sites are established) and reported in the Annual Report. Additional offset measures may need to be applied if indirect impacts occur, subject to their spatial extent and likely longevity.

450000

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LATROBE LEVEE PROJECT

OFFSET MANAGEMENT AND MONITORING PLAN

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

TASMAP:
LATROBE

LGA:
LATROBE

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

an 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

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

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