

# Attachment C

## Updated Corangamite Water Skink Management Plan

# Corangamite Water Skink Management Plan - Stage 5 and Stage 6

Colac Quarry Extension (WA158), Victoria



## Corangamite Water Skink Management Plan - Stage 5 and Stage 6

Colac Quarry Extension, WA158, 75-95 Potters Road, Ondit, Victoria

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1 February 2021

Job No.: 60557359

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## Quality Information

Document Corangamite Water Skink Management Plan - Stage 5 and Stage 6


Ref 60557359

Date 1 February 2021

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Reviewed by Chris White

### Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	03-May-2019	Draft	Amie Cullum Associate Director	
B	18-Jun-2019	For Consultation	Amie Cullum Associate Director	
0	07-Aug-2020	Final	Amie Cullum Associate Director	
1	11-Nov-2020	Revised final – minor updates in consideration of DAWEs comments	Amie Cullum Associate Director	
2	1-Feb-2021	Revised final - Updates following DELWP/ DAWE comments	Amie Cullum Associate Director	

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## Terms

Acronym / Term	Explanation
CaLP Act	<i>Catchment and Land Protection Act 1994</i>
CWS	Corangamite Water Skink
DAWE	Department of Agriculture, Water and Environment (formerly DoEE)
DELWP	Department of Environment, Land, Water and Planning
DOEE	Department of Environment and Energy
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
HZ	Habitat Zone
mAHD	metres Australian Height Datum
mbgs	metres below ground surface
SDA	Southern Development Area

## 1.0 Introduction

AECOM Services Pty Ltd (AECOM) was engaged by Holcim (Australia) Pty Ltd (Holcim) to prepare a management plan for the Corangamite Water Skink *Eulamprus tympanum marnieae* for the proposed Stage 5 and Stage 6 extension areas for its basalt quarry at 75 – 95 Potters Road, Ondit, situated to the north of Lake Colac, Victoria (Figure 1 - Appendix A).

The site has been in operation as a basalt quarry since 1972. Currently Holcim are extracting basalt rock from the approved extraction limit within WA158. Holcim plan to expand its quarry operations under Work Authority WA158 into two additional areas referred to as Stage 5 and Stage 6 (see Figure 2 - Appendix A). These areas are in an unquarried portion of the property east of the former quarry pit in the north-east of the quarry.

This management plan has been prepared as part of the approvals process for extension of the existing quarry into the Stage 5 and Stage 6 areas only and is not intended to supersede existing management plans already in place for the Southern Development Area (SDA).

### 1.1 Background

Colac Quarry is known to support a population of Corangamite Water Skink which was found within the quarry in 2005 (Biosis 2018). This species is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), endangered in the Action Plan for Australian Reptiles (Cogger et al.1993), threatened under the *Flora and Fauna Guarantee Act 1988* (FFG Act) and is critically endangered in Victoria (DSE 2013).

The presence of this species within the quarry means that extraction must be undertaken in a manner which avoids or minimises impact on Corangamite Water Skink. Approvals for the previous SDA extension of Work Authority (WA158) included the preparation and implementation of a management plan for the Corangamite Water Skink and retained areas of Stony Knoll Shrubland vegetation to define management and monitoring requirements (Biosis Research 2007). Measures contained within the management plan to assist in avoiding or minimising impact on Corangamite Water Skink formed the basis of approval for the action of extending the quarry into the SDA under the EPBC Act (EPBC 2006/3003; 12 September 2006). These measures included protecting retained areas of habitat, creation of new habitat, salvage of Corangamite Water Skinks and annual surveys for 10 years within the quarry. The plan was prepared in consultation with the Victorian Government Department of Environment, Land, Water and Planning (DELWP) and the Corangamite Water Skink National Recovery Team. A salvage and translocation plan for Corangamite Water Skink was also prepared (Biosis Research 2010) and formed part of the approval for the SDA extension.

Implementation of the management plan commenced in 2008 and monitoring of the Corangamite Water Skink has occurred since summer 2008-2009. The 10-year annual monitoring program concluded in 2018 and a review has been completed (Biosis 2018). No Corangamite Water Skinks were found within the SDA since 2005 therefore the translocation plan was not implemented.

### 1.2 Proposed works

Holcim are proposing to extract basalt from the areas referred to as Stage 5 and Stage 6 (Figure 2 - Appendix A). The proposed extraction extension into Stage 5 and Stage 6 is required as current approved reserves are nearing depletion. Extraction of Stage 5 and Stage 6 will follow a sequence of Stage 6 followed by Stage 5 to be extracted in two substages (Stage 5a followed by Stage 5b). Rock quality and market demand will determine which stages in this sequence are ultimately extracted.

Stage 6 is adjacent to the former quarry pits which have become inundated with water as part of the rehabilitation of that area. This older quarry section is referred to the northern pits and is the primary water storage area for the quarry. The northern pits comprise a number of basins (Basins 1-6) which are shown on Figure 2- Appendix A. Basin 5 and Basin 2 are located to the south and west of Stage 6 respectively.

The northern wall of Basin 5 will be removed to facilitate access into Stage 6.

The eastern wall of Basin 2 will be lowered by approximately 5 m from its current height of 125 mAHD to 120 mAHD to meet rehabilitation and safety requirements. Rehabilitation of the wall remains a commitment of the rehabilitation plan previously approved for the northern pits for WA 158.

A bund will be constructed to 120 mAHD between Basin 5 and Basin 4 to facilitate dewatering of Basin 5 and allow an internal haul road to be constructed across the Basin 5 area to connect Stage 6 with the processing plant. The haul road will pass through the existing approved extraction area between Stage 5 and Stage 6, along the western edge of Stage 5.

Dewatering of Basin 5 to facilitate access to Stage 6 and ongoing dewatering of Stage 5 and Stage 6 during operation is predicted to increase water levels in the northern pits to a maximum of 118 mAHD. This represents an increase of approximately 2 m above the historic maximum level of 115.8 mAHD.

Stage 5 is located between areas approved for extraction in 1997 (see Figure 2- Appendix A). Extraction in this area will be done in two sub-stages subject to market demand: Stage 5a and Stage 5b. Stage 5b is the last area that will be extracted.

Holcim intend to continue to apply the management measures previously approved for the SDA extension (Biosis Research, 2007; 2010) to the Stage 5 and Stage 6 expansion areas. As such, this management plan has been prepared for extraction areas Stage 5 and Stage 6 in line with the management plan implemented for the SDA and with full acknowledgement of the development of these measures by Biosis in preparing those plans for Holcim. This management plan is not intended to replace or supersede the previously approved management plans for the SDA (Biosis Research 2007; 2010).

Pending approval, reserves will be depleted within approximately four years of commencement of extraction. As such, this plan has assumed a management period of up to 10 years from commencement of extraction.

### 1.3 Corangamite Water Skink at Colac Quarry

Monitoring of Corangamite Water Skink has been undertaken by Biosis within the Colac Quarry property since 2005. Survey in 2005/06 was initially completed as part of the impact assessment for the SDA extension. A ten-year annual monitoring program commenced in 2008-09 and concluded in 2017/18 as part of the approval conditions for the SDA. An additional monitoring event was undertaken in 2019/20 to provide an update on the Corangamite Water Skink population within the quarry to inform the assessment of impacts for Stage 5 and Stage 6 and to maintain continuity of monitoring data in anticipation of monitoring continuing as part of the Stage 5 and Stage 6 conditions of approval.

Corangamite Water Skink records are shown in Figure 3 – Appendix A. This figure compiles the results from past monitoring (Biosis 2015; 2018), the flora and fauna assessment of Stage 5 and Stage 6 (AECOM 2020) and a recent survey undertaken during the 2019/20 season (Biosis 2020).

The outcomes of the population monitoring suggest that rocky environments away from standing water are not permanent or key habitat for Corangamite Water Skink. Skinks were recorded on dry stony rises and in drystone walls in 2005 during a longer-term high rainfall period and, until a single record in the most recent (2019/20) season, had not been recorded in those environments since. Dry conditions since 2005 are still the most likely explanation for the absence of records in the SDA and Southern Farm Area over that time (Biosis 2020).

Despite the 2019/20 record in the Southern Farm Area, the rocky environments adjacent to water continued to support the species through the monitoring periods and are still the optimal areas of habitat within the quarry. Deep rock jumbles with multiple crevices that abut the water's edge were identified as the best microhabitat for Corangamite Water Skinks within Colac Quarry (Biosis, 2017; Peterson and Robertson 2011).

Corangamite Water Skinks have persisted at Colac Quarry following the initial discovery of the population in 2005. However, the overall size and distribution of the population has reduced over that time. Important aspects related to this reduction noted by Biosis (2018) are:



- Loss of the species from natural stony rises in the SDA and Southern Farm Area between 2005/06 and 2008/09 survey seasons most likely due to particularly dry conditions between 2005 and 2008 (especially in 2006).
- Reduced number of observations around the margins of the flooded former quarry since the 2015/16 survey season. This appears to be the result of higher water levels since 2016. The water level rise was not thought to be associated with quarrying activities in the SDA, instead attributed to increase of rainfall experienced in the area.

Most locations from which Corangamite Water Skink was recorded in the SDA and Southern Farm Area in 2005 have been protected and have not been subject to disturbance by quarry activities from 2005. This habitat is therefore available to the species at times when conditions are most similar to those experienced in 2005 when the species last occupied those locations.

Biosis (2018) consider that *'In the longer-term, all exhausted areas of the quarry will form a complex of permanent wetlands with areas of surrounding rocky habitat. The capacity for Corangamite Water Skinks to colonise such areas is demonstrated well by their occupation of such areas that already exist in the northern part of the property and their occupation of areas where quarrying has finished more recently.'* (p17).

The ability of the Corangamite Water Skink to colonise new habitat has been demonstrated by:

- The establishment and ongoing presence of a population of Corangamite Water Skink on the margins of the former northern pits (Basins 1-6). It is unknown how long it took Corangamite Water Skink to colonise the quarry originally as survey did not occur until 2005 which was 33 years after the quarry began operating in 1972.
- Observations of Corangamite Water Skink in habitat created in Basin 6 in 2008. Corangamite Water Skink were first recorded in February 2016 (2015/16 monitoring season) and have been recorded there each year of monitoring since (Biosis, 2018; 2020).
- More recent records of Corangamite Water Skink in the pre-2008 quarry area to the south of new Stage 5. This habitat was not specifically created for the Corangamite Water Skink but quarrying activity in that area has provided habitat for the species. Quarrying activities were completed in the area before, or soon after, 2008 and Corangamite Water Skink were first recorded in the 2016/17 monitoring season (Biosis, 2018).
- The use of drystone walls historically constructed on the farm properties adjacent to Lake Colac (Biosis, 2017).

The quarry forms part of the Lake Colac population of Corangamite Water Skink which is recognised as an important population in the National Recovery Plan for the species (Peterson and Robertson 2011). The Lake Colac population of Corangamite Water Skink extends beyond Colac Quarry to habitat on the shoreline of Lake Colac and is known to also occur on private land to the immediate west and north of Colac Quarry (Biosis Research 2007; 2010). Given the quarry is artificial habitat created inadvertently by quarrying activities, it is reasonable to consider the shoreline of Lake Colac to have been the source of the animals now residing within the quarry. The species may have occurred in the stony knolls prior to quarrying commencing in the 1970s but it appears that was likely to have been primarily during wetter years (Biosis 2018).

The Lake Colac population is now likely to be centred around the shoreline of Lake Colac and areas within portions of Colac Quarry that have become inundated as quarrying is completed.

### 1.3.1 Stage 5

A small dam within Stage 5 supports optimal habitat features for Corangamite Water Skink with an open body of water fringed with rocks and earth cavities (Plate 1). The dam is fed with water pumped from the active quarry (quarry manager, Holcim, pers. comm.) through a pipe into a short section of open rock-lined channel leading into the dam. The dam is surrounded by mounded earth and rocks which are mostly embedded rather than on the surface. One Corangamite Water Skink was observed at this location in December 2017 (AECOM 2020) and again in early 2020 (Biosis 2020).



**Plate 1- Habitat occupied by Corangamite Water Skink in Stage 5 expansion area**

To the immediate west of Stage 5 is an area of the former quarry pit (Basin 6) which was the site chosen for creation of Corangamite Water Skink habitat as part of the implementation of the SDA management plan. Corangamite Water Skink have been recorded in the created habitat since 2015/16 (Biosis 2018, 2020; AECOM 2020).



**Plate 2- Corangamite Water Skink habitat in Basin 6 to the west of the Stage 5 extension area**

### 1.3.2 Stage 6

One structurally complex stony knoll occurs in Stage 6 (Figure 2- Appendix A) however it is not adjacent to water and is therefore considered to be sub-optimal habitat for Corangamite Water Skink on the basis of the findings of previous monitoring (Biosis 2017; 2018).



**Plate 3- More complex stony knoll habitat (Stage 6) - sub-optimal habitat as it is not adjacent to water**

Immediately adjacent to the southern and western edges of Stage 6 is the former quarry pit which is now inundated with water and forms a large water storage area fringed by rock cliff faces and some areas of grassy slopes. Rock jumbles at the base of the cliff face of Basin 2 (western edge of Stage 6) provided habitat that was occupied by Corangamite Water Skink until water levels rose in 2016 and rendered the microhabitat unsuitable. Corangamite Water Skink were recorded in a rock jumble on the northern face of Basin 5 (southern edge of Stage 6) in 2019/20 (Biosis 2020).

Corangamite Water Skinks within the former quarry pit have typically been observed either in jumbles of rocks in the base of pits, adjacent to the bottom of pit walls or on dissected rocky faces of walls. The plateau above the pit walls does not generally provide suitable microhabitat (I. Smales, Biosis, pers comm.).



**Plate 4- Corangamite Water Skink habitat on northern wall of Basin 5 (southern edge of Stage 6).**

## 2.0 Objectives

The objective of this management plan is to outline measures to minimise impacts on Corangamite Water Skink resulting from expansion of Colac Quarry extraction into Stage 5 and Stage 6. These measures include:

- Retention and protection of habitat where feasible.
- Ongoing creation of new areas of habitat (rock jumbles) adjacent to existing waterbodies.
- Salvage and relocation of Corangamite Water Skink.
- Monitoring of the Corangamite Water Skink population.

The management plan for Stage 5 and Stage 6 reflects the intent and recommendations contained within existing management plans for the quarry. These are:

- *Management plan for the Corangamite Skink and Native Vegetation offsets: Readymix Quarry and proposed Southern Development Area, Colac.* (Biosis Research 2007)
- *Holcim Colac Quarry Corangamite Water Skink Translocation Plan* (Biosis Research 2010) which was prepared in consultation with DELWP and the Corangamite Water Skink Recovery Team.

Rather than duplicate information, this management plan for Corangamite Water Skink in Stage 5 and Stage 6 aims to provide a summary of the approach specific to those areas with reference to the details already provided by the existing plans. Where the approach differs or needs to be tailored to Stage 5 and Stage 6 then detail is provided below.

A copy of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan is therefore provided in **Appendix B** as a key reference document for implementation of this plan for Stage 5 and Stage 6.

## 3.0 Protection of existing habitat

### 3.1 Aims

To retain and protect areas of existing habitat where possible.

### 3.2 Action

Existing habitat refers primarily to areas within the quarry that are known to provide habitat for Corangamite Water Skink (refer to Figure 3 – Appendix A). In areas where existing habitat is retained:

- Maintain a 10 m wide buffer between works and retained or created habitat
- Fence or construct a bund to protect retained habitat from inadvertent damage should new works be planned within 10 m of habitat.
- Install measures to prevent rocks/earth from falling down the cliff face of the western edge of Stage 6 and covering areas of habitat which, although currently covered by water, may provide habitat again if the water level recedes.
- Ensure post-extraction rehabilitation works do not impact on created or retained habitat.

## 4.0 Habitat creation and management

Habitat creation is important as existing habitat within the quarry is likely (or is known) to be currently occupied by Corangamite Water Skink. The species is territorial (Peterson and Robertson, 2011) and therefore animals released into an existing population are unlikely to survive antagonistic encounters with current occupants. Corangamite Water Skinks are known to colonise artificial habitat as evidenced by the natural colonisation of habitat inadvertently created around the edges of the former quarry and habitat created as part of implementing the SDA extension (Biosis Research 2010; AECOM 2020).

Optimal areas of habitat are those with fractured and jumbled large rocks with some shrub cover adjacent to water bodies (Peterson and Robertson 2011). These areas are of particular value as the exposed rocks provide basking sites and the crevices provide protection from predators and humid conditions which provide protection from desiccation (Biosis Research 2006). The species occupies small home ranges thought to be <10m<sup>2</sup> (Peterson and Robertson 2011). Consideration of this home range size has informed the specifications for the created habitat.

### 4.1 Aim

To continue to construct new Corangamite Water Skink habitat along the edges of existing former quarry extraction areas.

Suitable areas for habitat creation have been selected based on:

- areas where habitat does not already exist,
- habitat that will not be impacted by future quarry operational requirements, and
- habitat where the former quarry pit is inundated.

### 4.2 Actions

Habitat creation to compensate for loss of habitat will be achieved in two ways:

- As a measure to mitigate the impacts of progressive water level increase by allowing Corangamite Water Skink to migrate from existing habitat as the water level changes.
- As new areas of habitat to replace (offset) habitat to be lost in Stage 5 and Stage 6.

Actions for location, extent, timing, design and management and monitoring associated with habitat creation are outlined below.

#### 4.2.1 Location

Areas for habitat creation are identified in Figure 4- Appendix A and have been selected based on:

- areas where suitable rocky habitat does not already exist on the margin,
- habitat that will not be impacted by future quarry operational requirements, and
- habitat where the former quarry pit is inundated.

#### 4.2.2 Extent

- Widen 150 lineal metres of existing habitat in Basin 4 and Basin 6 to allow for migration of Corangamite Water Skink as water level rises to a maximum of 118m AHD. This supplementary habitat is to be created to mitigate the impacts of progressive water level rise and is in addition to habitat creation to compensate for (offset) habitat loss within Stage 5 and Stage 6. Creation of supplementary habitat should be supervised by an ecologist to minimise the risk of disturbance to the adjacent existing habitat.
- Create 340 lineal metres of new habitat situated such that rocks extend beyond the expected final water level, with a minimum contiguous extent of 25 lineal metres along the shoreline. An indication of areas for habitat creation to replace habitat to be lost in Stage 5 and Stage 6 is provided in Figure 4 - Appendix A and comprises areas on the:

- Eastern margin of Basin 6
- Southern margin of Basin 4
- Eastern margin of Basin 4
- Bund between Basin 1 and Basin 3.
- Create 670 lineal metres of additional habitat during rehabilitation of the terminal faces of the new pits formed for Stage 5 and Stage 6.
- 

#### 4.2.3 Timing

As the impacts are staged, the creation of habitat will also be staged as follows:

- Create the 150 lineal metres of supplementary habitat at least 2 months prior to Stage 6 commencing.
- Create the 340 lineal metres of new habitat prior at least nine (9) months incorporating one full spring-summer season prior to the salvage and relocation process for each stage (240 lineal metres for Stage 6 and 100 lineal metres for Stage 5). This timeframe would allow time for vegetation to establish and appropriate invertebrate prey to colonise the habitat and will allow a survey for Corangamite Water Skink to occur during the spring-summer survey period prior to quarrying in the Stage 5 and Stage 6 extension commencing.
- Create 280 lineal metres of new habitat during rehabilitation of the terminal faces of Stage 6 prior to groundwater being reached in Stage 5.
- Create the balance of habitat during rehabilitation of the terminal faces of Stage 6 and Stage 5 as required for each stage.

A summary of timing, extent and location of habitat creation for Stage 5 and Stage 6 is provided in Table 1.

**Table 1 - Habitat creation timing, extent and location for Stage 5 and Stage 6**

Timing	Extent	Type of habitat	Location
2 months prior to Stage 6	150 lineal metres	Supplementary habitat to mitigate indirect loss for Stage 6	Adjacent existing habitat northern pits
9 months prior to Stage 6	100 lineal metres	New habitat for direct loss for Stage 6	Northern pits
	140 lineal metres	New habitat for indirect loss for Stage 6	Northern pits
Rehabilitation of Stage 6	140 lineal metres	New habitat for indirect loss for Stage 6.	Stage 6
	280 lineal metres	New habitat for indirect loss for Stage 5	Stage 6
9 months prior to Stage 5	100 lineal metres	New habitat for direct loss for Stage 5	Northern pits
Rehabilitation of Stage 5	250 lineal metres	New habitat for direct and indirect loss for Stage 5	Stage 5 and/or Stage 6
<b>Total</b>	<b>1,160 lineal metres</b>		

#### 4.2.4 Design

Follow the description in Section 3.3.2 of Biosis Research (2007) and schematic in Figure 5 below which includes:

- Use rock overburden from quarry operation (mix of some soil and mostly rock)
- Create piles that are:
  - Minimum 25 lineal metre sections along the water edge spaced intermittently.
  - Minimum width of 5 metres:
    - Extending approximately 1.5 metres into the water.
    - Extending approximately 3.5 metres out of the water (Basin 4, Basin 6, Stage 6 rehabilitation) or approximately 1 metre above the 118mAHD water level on the bund between Basin 1 and Basin 3.
    - Average of 1 metre height of rock pile above ground surface level.
    - Comprised of a variety of rock sizes to create a high proportion of rock crevices as refugia for the skinks
  - Revegetate water body margins adjacent to the created outcrop with appropriate semi-aquatic plants including:
    - Marsh Club-rush *Bolboschoenus medianus*
    - Common Reed *Phragmites australis*
    - Sharp Club-sedge *Schoenoplectus pungens*
    - Water Ribbon *Triglochin procerum*
    - Southern Water-ribbons *Cycnogeton alcockiae*
  - Revegetate inland margins of created habitat with appropriate shrub species at:
    - a rate of 400 plants per hectare and
    - a ratio of 3 Tree Violets *Melicytus dentatus* s.s. to 0.5 Black Wattle *Acacia mearnsii* / Blackwood *A. melanoxylon* to 0.5 Sweet Bursaria *Bursaria spinosa*.

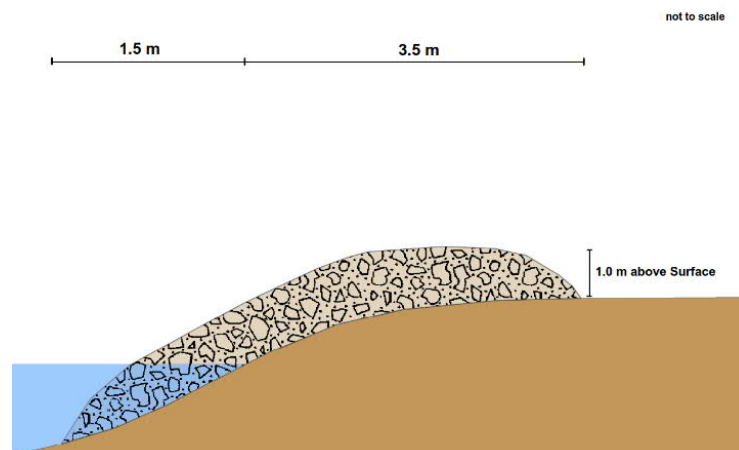


Figure 5 Conceptual drawing of habitat creation

- Allow for the maximum predicted water levels of the former quarry pit environment following bunding and dewatering of Basin 5 and dewatering Stage 5 and 6 during operation.



#### 4.2.5 Management and monitoring

- Implement measures to manage weeds and pest animals in areas of created habitat including engaging appropriately licensed personnel to:
  - Control CaLP listed shrub weeds to minimise shading of basking sites and allow native plants to establish and persist. Use spot spraying of pesticides to reduce detrimental impacts to Corangamite Water Skink. Use hand pulling or grubbing with hand tools where herbicide application will adversely impact on Corangamite Water Skink or their habitat.
  - Control rabbits and hares to reduce damage to created habitat (e.g. grazing of plantings and/or warrens occupying microhabitat for Corangamite Water Skink). Mechanical destruction of warrens should not be undertaken in areas of known Corangamite Water Skink habitat.
  - Control introduced predators such as foxes and cats.
- Monitor the use of created habitat by Corangamite Water Skink (see Section 6). If created habitat becomes occupied by Corangamite Water Skink it will be rendered unsuitable as a release site (as outlined in Section 5.2.2).
- Include habitat creation requirements in the rehabilitation plan to be prepared for Stage 5 and Stage 6 to be implemented at completion of extraction in those areas.
- Monitor water levels in the northern pits to ensure they do not exceed the predicted maximum of 118 mAHD. Implement the following measures:
  - Monthly monitoring of water levels based on the water level gauge in the northern pits during Stage 5 and Stage 6 operations.
  - Setting of a trigger level of 117 mAHD for the Quarry Operator to initiate an evaluation of the rate of groundwater dewatering and remaining pit life of Stage 5 and Stage 6.
  - Review of water management measures if the evaluation predicts that water levels may exceed the predicted maximum of 118 mAHD.
  - Implementation of alternative water management measures approved under existing operations if water levels in the northern pits may exceed 118mAHD. These measures include:
    - Temporarily cease dewatering in the Stage 5 and/or Stage 6 pits if increase in water levels is related to high rainfall events.
    - Irrigation of land within the quarry.
    - Placement of water into other areas of the quarry where extraction has been completed, such as the SDA, to maximise habitat opportunities for Corangamite Water Skink. Placement of additional water into the SDA must be consistent with the objectives in the approved End Use Plan (Biosis, 2017) and rehabilitation stage reached in the SDA.

#### 4.3 Protection mechanism

Habitat created for Stage 5 and 6 is to be protected in perpetuity through a section 173 agreement on title under the *Planning and Environment Act 1987*.

## 5.0 Salvage and relocation

Note: this salvage plan relates only to the Corangamite Water Skink and does not cover the capture or handling of other fauna species

### 5.1 Aims

To undertake a salvage and relocation program for Corangamite Water Skinks to capture individuals from areas of habitat to be removed and relocate them to nearby created habitat.

To undertake the salvage and relocation program in accordance with the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (Biosis Research 2010) where applicable to Stage 5 and Stage 6.

### 5.2 Actions

The salvage and relocation program entails a number of actions which need to be undertaken prior to, and during, the program. The program should be implemented by suitability qualified ecologists on behalf of Holcim.

#### 5.2.1 Timing

- Do not commence dewatering of Basin 5 or earthworks within 50 metres of areas of suitable habitat until salvage has been completed. The only exception to this approach would be the determination by project ecologists that salvage would be more effective and/or safer to be completed after Basin 5 is dewatered.
- Salvage needs to be undertaken immediately prior to works to reduce the risk of individuals moving back into the habitat between the time of salvage and works commencing. For this management plan, 'immediately prior' is defined as no more than 1 month prior.
- Undertake salvage during the optimal months of October and November. This is the time when gravid females are basking more often to ensure foetal development and coincides with the lowest number of animals in the populations annual cycle (Biosis Research 2010). Only one litter is produced each year in late December (DSE 2003).
- Salvage could also occur in September or March to April however this timing is less optimal.
- December to January is particularly sub-optimal as this coincides with the timing of litters being born (DSE 2003).
- Do not undertake salvage during the cooler months (May to August) when the species is inactive.

#### 5.2.2 Pre-salvage requirements

##### Targeted surveys

- Conduct two days of pre-salvage targeted surveys within Stage 5 and Stage 6 to confirm the location of known animals and determine whether additional areas not previously identified are inhabited by animals.

##### Identification of release sites

- Do not undertake salvage until release site/s have been identified and assessed for suitability.
- Identify areas of optimal habitat for release of salvaged Corangamite Water Skink. Optimal habitat is areas of fractured and jumbled large rocks with some shrub cover adjacent to water. This habitat can be existing or created but should be in locations that allow for the predicted maximum water level of 118mAHD and will be retained in perpetuity.
- Prioritise created habitat provided it has been completed at least 9 months prior (and that incorporates a full spring-summer season) to allow a period of settling and colonisation by appropriate invertebrate prey and establishment of vegetation.

- Survey potential release sites to determine whether they are occupied by Corangamite Water Skink. If potential release sites are occupied then they will generally be deemed unsuitable as a release site. As explained by Biosis Research (2010) this is 'due to the territorial nature of the animals and the expectation that resident Water Skinks would prevent newly released animals from establishing at the site' (pg 8).
- Assign a minimum of 15 metre linear distance from a location known to be occupied by Corangamite Water Skink to allow for the potential home range of the resident individual/s. According to Peterson and Robertson (2011), Corangamite Water Skink occupy small home ranges (most <10m<sup>2</sup>) therefore buffering by 15 metres either side of a location should avoid releasing a new individual into the home range of an existing individual (applying an assumption that the home range is 1 m x 10m) and allow for the potential for there to be other individuals present at, or near the location, given the species also tends to be social.
- Do not use a release site outside the boundaries of the quarry.

### Authorisations

- Do not commence dewatering or earthworks within 50 metres of areas of suitable habitat identified within Stage 5 or Stage 6 until salvage is complete and written confirmation of its completion is provided. Suitable habitat is defined as areas identified during previous surveys (Figure 3 – Appendix A) and any additional habitat identified during pre-salvage targeted surveys.
- Do not commence salvage without authorisation under the *Wildlife Act 1975* (refer to Section 5.4)
- Do not commence salvage without notifying DELWP in accordance with authorisation under the *Wildlife Act* (refer to Section 5.4).

### 5.2.3 Trapping

- Undertake a minimum of 4 days of trapping immediately prior to habitat removal, at locations where Corangamite Water Skink are observed during pre-salvage survey. Conduct trapping in accordance with the approach outlined in Section 5.2 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (Biosis Research 2010). This approach has been approved by DELWP as part of the preparation of the plan and includes:
  - Place traps out by 9am and monitoring until 6pm each day when they are to be closed or taken away
  - Position traps between rocks or in crevices with the lip of the trap level with surrounding rocks beneath shrubs where possible to reduce heat stress.
  - Place refugia into traps to reduce exposure and stress.
  - Transfer any Corangamite Water Skink caught during salvage to securely tied, dry cloth bag and place immediately into a styrofoam box to prevent heat stress.
  - Record the location of all Corangamite Water Skink found using GPS.
  - Continue trapping as required if more than two Corangamite Water Skinks are trapped on each of the final days of the salvage period. Continue until no skinks are caught.

### 5.2.4 Release

- Implement health evaluation as outlined Section 5.3.1 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (**Appendix B**).
- Implement measures outlined Section 5.3.2 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan relating to Corangamite Water Skink mortalities (**Appendix B**).
- Take high resolution photographs of the ventral surface of each individual Corangamite Water Skink caught in accordance with Section 5.3.3 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (**Appendix B**).
- Follow the release procedures outlined in Section 5.3.5 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (**Appendix B**).

- Survey release site immediately prior to relocation to confirm if it is occupied by Corangamite Water Skink for the same reasons outlined in Section 5.2.1 above. Do not release animals at the site if another Corangamite Water Skink is present.

### 5.3 OHS considerations

Safety measures applicable to the location and the activity must be adopted. These measures include, but are not limited to the following:

- Salvage team members must
  - Complete the Holcim site induction and any other relevant site access inductions
  - Wear Personal Protective Equipment (PPE); minimum standard is high visibility safety vest and steel capped safety boots but could also include items such as hard hat, gaiters, ear plugs and safety glasses or any other equipment as required.
- Vehicles must be fitted with an operational flashing beacon located on top of the vehicle

The suitably qualified consultant must hold all necessary insurance cover for its staff members.

### 5.4 Authorisations

A Management Authorisation (permit) issued under the *Wildlife Act 1975* is required from DELWP to undertake salvage and relocation of Corangamite Water Skinks and only suitably qualified and authorised persons are to undertake salvage and relocation.

AECOM hold a management authorisation which allows for the salvage and relocation of CWS within the same site and within 100 m of the point of capture (permit no. 10008049). In this instance, the likely point of release is the edge of the former quarry pit within the same site but more than 100 m from the CWS records within Stage 5 and Stage 6. AECOM therefore sought confirmation from the DELWP Translocation Evaluation Panel (TEP) that the action of moving the individuals more than 100 m to suitable habitat within the Colac Quarry site does not require an application to the TEP. The TEP advised that a translocation proposal is not required in this case.

The DELWP Environmental Research Coordinator must be notified of salvage works being conducted under a permit. At that time, advice received from the TEP must be provided to indicate that relocation of Corangamite Water Skinks beyond 100 m but within the quarry site is permitted.

## 6.0 Population monitoring

### 6.1 Aims

Monitoring of Corangamite Water Skink within Colac Quarry aims to:

- Assess the success of trapping and relocation program for Stage 5 and Stage 6.
- Assess the success of habitat creation.
- Ascertain whether quarry activity, particularly rock extraction in Stage 5 and Stage 6, has an impact on the resident population of Corangamite Water Skink.

As outlined in Section 6 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (Appendix B) this will be quantified by:

- Ongoing presence of animals within retained and created habitat over successive years.
- An increase in numbers of Corangamite Water Skinks within created habitat.

### 6.2 Actions

- Monitor the Corangamite Water Skink population annually for a period of 10 years following commencement of the Stage 5 and Stage 6 extension.
- Undertake monitoring in accordance with the methods outlined in Section 6.3 of the Holcim Colac Quarry Corangamite Water Skink Translocation Plan (Appendix B) and the 10-year review of monitoring (Biosis 2018).
- This includes conducting surveys each year in the following areas:
  - A reference site, supporting a known population of the Corangamite Water Skink at Meredith Park on the northern shore of Lake Colac (surveyed on each day of survey to ascertain that Corangamite Water Skinks were active on the day).
  - Margins of the former (flooded) quarry including the basin area that supplies water to the quarry processing facility on the western side of the study area.
  - Created habitat on the southern shore of the former quarry.
  - Habitat created as part of implementing this plan in accordance with Section 4 above.

## 7.0 Reporting and review

### 7.1 Aim

To document the outcomes of the implementation of this Plan and provide an opportunity to revise the approach as needed.

### 7.2 Actions

- Prepare a report on the salvage and relocation program on completion of salvage. Submit the report to:
  - DELWP Translocation Evaluation Panel
  - DELWP Environmental Research Coordinator as a requirement of the management authorisation
  - Other DELWP officers – Garry Peterson- Program Manager Natural Environment Programs
- Prepare a report annually detailing the results of post-release monitoring. Submit the report annually to:
  - DELWP Environmental Research Coordinator as a requirement of the management authorisation
  - Other DELWP officers – Garry Peterson Program Manager Natural Environment Programs
- Prepare a review report at the completion of the salvage and monitoring program.

## 8.0 Summary of actions - Stage 5 and Stage 6

Table 2 Summary of actions, timing, responsibility, performance targets and reporting requirements

Action	Number	Action description	Timeframe	Timing	Duration	Responsibility	Performance target	Follow up action if target not met
Habitat protection	1	Protect all areas of retained and created CWS habitat	Pre-commencement	Prior to quarrying	Once	Quarry Operator	Habitat protected from quarrying activities through clear demarcation. Measures such as star picket and wire fence or earth bund may be used to achieve demarcation between quarry areas and created habitat.	Review habitat protection measures if habitat is not protected from quarry activities. Implement additional or different measures if required.
Habitat creation	2a	Create new habitat in the northern pits to offset direct and indirect habitat loss for Stage 6	Pre-commencement	At least 9 months prior to commencement of Stage 6 incorporating a full spring-summer season.	Once	Quarry Operator	240 lineal metres created	Create additional habitat to achieve the 240 lineal metres within 1 month of performance target not met.
	2b	Create new habitat in the northern pits to offset direct habitat loss for Stage 5	Pre-commencement	At least 9 months prior to commencement of Stage 5 incorporating a full spring-summer season.	Once	Quarry Operator	100 lineal metres created	Create additional habitat to achieve the 100 lineal metres within 1 month of performance target not met.
	3	Create supplementary habitat to mitigate the impacts of water level increase prior to salvage and relocation	Pre-commencement	At least 2 months prior to Stage 6 commencement.	Once	Quarry Operator	150 lineal metres created	Create additional habitat to achieve the 150 lineal metres within 1 month of performance target not met.
	4a	Create habitat on the terminal faces of the new pit of Stage 6 to offset indirect loss of Stage 5.	Rehabilitation	Prior to groundwater being reached in Stage 5.	Once	Quarry Operator	280 lineal metres created	Create additional habitat to achieve the 280 lineal metres.
	4b	Create habitat on the terminal faces of new pit of Stage 6 to further compensate habitat loss for Stage 6.	Rehabilitation	Completed as part of rehabilitation of Stage 6	Once	Quarry Operator	140 lineal metres created	Create additional habitat to achieve the 140 lineal metres.
	4c	Create habitat on the terminal faces of new pits to further compensate habitat loss for Stage 5.	Rehabilitation	Completed as part of rehabilitation of stages	Once	Quarry Operator	250 lineal metres created	Create additional habitat to achieve the 250 lineal metres.
	2a – 4c							Population number remains within 50% of the count in the previous year.

Action	Number	Action description	Timeframe	Timing	Duration	Responsibility	Performance target	Follow up action if target not met
Salvage and relocation	5	Obtain management authorisation	Pre-commencement	Prior to salvage of Stage 6 Prior to salvage of Stage 5	Once	Suitably qualified ecological consultant	Management authorisation obtained	Obtain management authorisation prior to salvage
	6	Advise DELWP of salvage commencement	Pre-commencement	Prior to salvage of Stage 6 Prior to salvage of Stage 5	Once	Suitably qualified ecological consultant	DELWP advised.	Advise DELWP prior to salvage, or as soon as absence of notification identified.
	7	Identify release site/s	Pre-commencement	Two months prior to salvage of Stage 6 Two months prior to salvage of Stage 5	Once for each stage.	Suitably qualified ecological consultant in conjunction with Quarry Operator	Release site/s identified.	Identify release site/s before survey.
	8	Undertake Corangamite Water Skink survey of potential release sites	Pre-commencement	One month prior to salvage of Stage 6 One month prior to salvage of Stage 5 Optimal timing: September to February	Minimum 2 days. Once for each stage.	Suitably qualified ecological consultant in conjunction with Quarry Operator	Survey completed.	Complete prior to salvage.
	9	Pre-salvage trapping survey of habitat to be removed	Pre-commencement	No more than 2 weeks prior to salvage in Stage 6. No more than 2 weeks prior to salvage in Stage 5. Optimal timing: September to February.	Minimum 2 days each stage.	Suitably qualified ecological consultant on behalf of Quarry Operator	Pre-salvage trapping completed.	Complete before salvage.



Action	Number	Action description	Timeframe	Timing	Duration	Responsibility	Performance target	Follow up action if target not met
	10	Salvage and release program	Pre-commencement	<p>No more than 1 month prior to dewatering Basin 5 or earthworks within 50 metres of areas of suitable habitat (Basin 5 wall) for Stage 6.</p> <p>No more than 1 month prior to earthworks within 50 metres of areas of optimal habitat (farm dam) in Stage 5.</p> <p>Optimal timing: October to November Sub-optimal timing: September, February to April Ideally avoid December to January Unsuitable timing: May to August</p>	Minimum 4 days or until no CWS trapped for each stage	Suitably qualified ecological consultant on behalf of Quarry Operator	Salvage completed.	Complete salvage and release prior to commencement of quarrying activities.
Monitoring	11	Monitor the Corangamite Water Skink population in Colac Quarry	Operation	Annually in Spring/Summer	Ten years from Stage 5 / Stage 6 extraction commencement	Suitably qualified ecological consultant on behalf of Quarry Operator	Population number remains within 50% of the count in the previous year.	<p>Review numbers in the context of the overall Lake Colac population and prevailing climatic conditions that year if numbers drop below historic range.</p> <p>Conduct additional monitoring to confirm if individuals overlooked during the survey.</p> <p>Review quarry operations, habitat protection and management measures in consultation with DELWP if contextual review suggests a reduction in population is restricted to the quarry environment and is not attributed to a change in climate.</p>
	12	Monitoring condition of the retained and created habitat	Operation	At time of population monitoring	Ten years from Stage 5 / Stage 6 extraction commencement	Suitably qualified ecological consultant on behalf of Quarry Operator	<p>Condition and integrity of habitat is maintained.</p> <p>At least 10% cover native shrubs</p>	<p>Supplementary planting</p> <p>Weed control (Action 17)</p> <p>Pest control (grazing pressure) (Action 18)</p>

Action	Number	Action description	Timeframe	Timing	Duration	Responsibility	Performance target	Follow up action if target not met
	13	Monitor water levels in the northern pits	Operation	Monthly	Until dewatering of Stage 5 and Stage 6 ceases	Quarry Operator	Water level in the northern pits does not exceed 118mAHD. To meet this target, an interim target of 117 mAHD has been set.	If water levels exceed 117 mAHD, initiate an evaluation of rate of groundwater dewatering and remaining Stage 5/6 pit life. Review of water management measures if evaluation predicts water levels may exceed 118 mAHD. Liaise with DELWP with water levels exceed 117m AHD and during review of water management measures. Implement alternative water management measures if water levels in the northern pits may exceed 118mAHD (refer to Section 4.2.3).
	14	Monitor weeds in retained and created habitat	Operation and into rehabilitation phase	Annually	Ten years from Stage 5 / Stage 6 extraction commencement	Suitably qualified ecological consultant on behalf of Quarry Operator	<10% cover woody weeds < 20 % cover CALP Act listed weeds No new CaLP Act listed weeds	Control weeds (Action 17)
	15	Monitor pest animals within quarry	Operation and into rehabilitation phase	Annually	Ten years from Stage 5 / Stage 6 extraction commencement	Quarry Operator	No discernible increase in pest animal numbers No additional pest animals established on the site.	Control pest animals (Action 18)
Management	16	Inspect and maintain measures protecting retained and created habitat	Operation	Bi-annually	Ongoing	Quarry Operator	Habitat protection measures as established in Action 3 and 4 remain in place.	Reinstate protective measures if damaged.
							No incidents of accidental entry by personnel or equipment	Review protective measures in the event of an incident.
	17	Control weeds in retained and created habitat	Operation	Quarterly	Ongoing	Quarry Operator	<10% cover woody weeds < 20 % cover CALP Act listed weeds	Review weed control measures.
							No new CaLP Act listed weeds established (a species will be considered established if it has greater than 1% cover).	Review quarry activities to determine source of infestation.
							Maintain a log of weed control events and methods undertaken.	Implement log and documentation requirements if log not maintained.

Action	Number	Action description	Timeframe	Timing	Duration	Responsibility	Performance target	Follow up action if target not met
	18	Control pest animals within quarry	Operation	Annually - March/April	Ongoing	Quarry Operator	Pest animal control completed if monitoring identifies it is required.	Review pest animal control measures.
							Maintain a log of pest animal control events and numbers of pest animals managed	Implement log and documentation requirements if log not maintained
Reporting	19	Corangamite Water Skink population and habitat monitoring	Operation	Annually	Ten years from Stage 5 / Stage 6 extraction commencement	Suitably qualified ecological consultant on behalf of Quarry Operator	Report produced annually and provided to DELWP within one month of final report issue	Complete report and provide to DELWP within one month of identification of absence of report.
							Submit records of Corangamite Water Skink to the Victorian Biodiversity Atlas.	Submit records to the Victorian Biodiversity Atlas within one month of identification of records not lodged.
	20	Population monitoring program	Operation	At completion of 10-year monitoring program	Once	Suitably qualified ecological consultant on behalf of Quarry Operator	Report produced at completion of 10 year monitoring program and provided to DELWP within one month of final report issue.	Complete and provide to DELWP within one month of identification of absence of report.
							Habitat creation commitments have been met and population has remained within 50% of the count in the previous year.	Liaise with DELWP regarding the need for contingency measures.
	21	Maintain a log of all incidents and management activities	Operation	Annually and at completion of 10-year monitoring program	Ten years from Stage 5 / Stage 6 extraction commencement	Quarry Operator	Log of incidents to be maintained and to be available for inclusion in above reporting requirements.	Implement log and documentation requirements if log not maintained

## 9.0 Implementation Schedule

An outline of the timeframes for implementing the actions outlined in the management plan is provided in Table 2. The timeframes are separated into pre-commencement actions before any extension works start, actions to be completed prior to Stage 6 commencement as this is the first expansion area to be extracted, actions to be completed prior to Stage 5 commencement and operational requirements for the whole expansion.

Table 3 Implementation Schedule - Stage 5 and Stage 6 expansion, Colac Quarry

Timeframe	Aim	Action for implementation	Notes on Timing	
<b>PRE-COMMENCEMENT (ALL)</b>				
6 months prior	Habitat protection	Retain and protect areas of existing or created habitat where possible		
	Habitat management	Control pest animals and weeds in areas of existing or created habitat	On going	
2 months prior	Habitat creation	Create a minimum of 150 lineal metres of additional habitat to augment existing habitat in Basin 4 and Basin 6.		
	Monitoring	Undertake Corangamite Water Skink survey of release sites / monitoring of created habitat	Two months prior to salvage. Optimal timing: September to February	
	Salvage and relocation	Obtain management authorisation		Two months prior to salvage
		Advise DELWP of salvage commencement		One month prior to salvage
<b>STAGE 6 - PRE-COMMENCEMENT</b>				
9 months prior (at least and incorporating a full spring-summer season)	Habitat creation*	Create minimum of 240 lineal metres of new habitat adjacent to existing waterbody prior to salvage and relocation		
0 – 2 months prior to Stage 6 commencement	Salvage and relocation	Identify release site/s	One month prior to salvage for Stage 6.	
		Survey potential release sites to determine if occupied	One month prior to salvage for Stage 6. Optimal timing: Spring/Summer	
		Undertake pre-salvage trapping survey of habitat to be removed for Stage 6 (Basin 5 wall)	No more than 2 weeks prior to salvage in Stage 6. Optimal timing: September to February.	
		Implement salvage and release program	No more than 1 month prior to dewatering Basin 5 or earthworks within 50 metres of areas of suitable habitat (Basin 5 wall) for Stage 6. Optimal timing: October to November Sub-optimal timing: September, February to April Ideally avoid December to January Unsuitable timing: May to August	
	Reporting	Prepare a Salvage and Relocation Program Report on completion of the salvage program for Stage 6.	At completion of the salvage and relocation program for Stage 6.	
<b>STAGE 5 - PRE-COMMENCEMENT</b>				
9 months prior (at least and incorporating a full spring-summer season)	Habitat creation*	Create minimum of 100 lineal metres of new habitat adjacent to existing waterbody prior to salvage and relocation		
0 – 2 months prior to Stage 5 commencement	Salvage and relocation	Identify release site/s	One month prior to salvage in Stage 5.	
		Survey potential release sites to determine if occupied.	One month prior to salvage for Stage 6. Optimal timing: Spring/Summer	

Timeframe	Aim	Action for implementation	Notes on Timing
		Undertake pre-salvage trapping survey of habitat to be removed in Stage 5 (dam).	No more than 2 weeks prior to salvage in Stage 5. Optimal timing: September to February (immediately prior to salvage)
		Implement salvage and release program	No more than 1 month prior to earthworks within 50 metres of areas of optimal habitat (farm dam) in Stage 5. Optimal timing: October to November Sub-optimal timing: September, February to April Ideally avoid December to January Unsuitable timing: May to August
	Reporting	Prepare a Salvage and Relocation Program Report on completion of the salvage program for Stage 5.	At completion of the salvage and relocation program for Stage 5.
<b>OPERATION (ALL)</b>			
Year 1 – 10	Population monitoring	Undertake annual Corangamite Water Skink monitoring and report	Spring/Summer
	Habitat management	Control weeds in areas of retained and created habitat.	Quarterly
	Habitat management	Control pest animals (predators and grazing animals).	Optimal time: March - April
Dewatering of Stage 5 and Stage 6	Water level monitoring	Undertake water level monitoring of the northern pits until dewatering of Stage 5 and Stage 6 ceases.	Monthly
Resource exhausted in Stage 6	Habitat creation*	Create a minimum of 140 lineal metres of habitat as part of rehabilitation of the Stage 6 pit	Rehabilitation
Resource exhausted in Stage 5	Habitat creation*	Create a minimum of 530 lineal metres of habitat as part of rehabilitation commitments	Rehabilitation
Year 10	Reporting	Monitoring review report at completion of 10-year monitoring program.	At completion of monitoring

\*Areas for habitat creation are shown in Figure 4 (Appendix A)

## 10.0 References

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# Appendix A

Figures

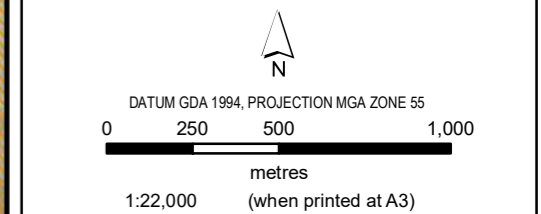
**Figure 1. Site Location, Colac Quarry**

**Figure 2. Site layout, Work Authority WA158, Colac Quarry**

**Figure 3. Corangamite Water Skink records**

**Figure 4. Corangamite Water Skink potential impact and mitigation**





- LEGEND**
- Work Authority Area - WA158
  - Cadastre - Parcel Description & Depth Limitations
  - House
  - Shed
  - Unclear
  - Watercourse
  - Waterbody
- Planning Zone**
- FZ - Farming
  - PCRZ - Public Conservation & Resource
  - RDZ1 - Road - Category 1
  - Cultural Heritage Sensitivity

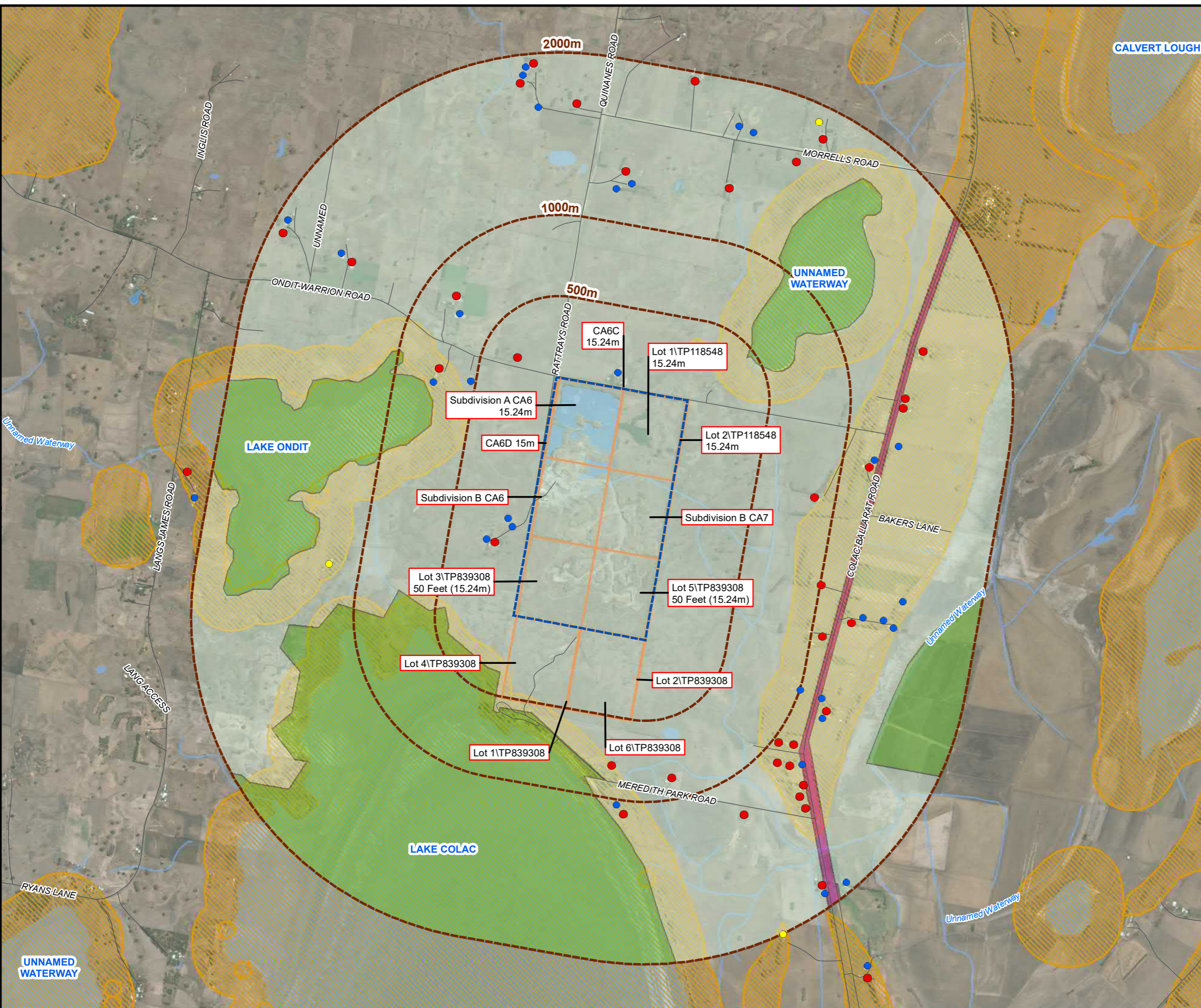
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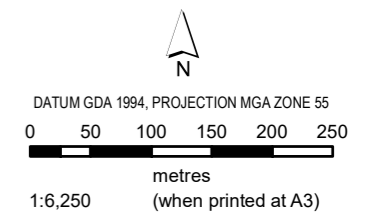
**SITE LOCALITY**

Holcim (Australia) Pty Ltd  
 Colac Quarry - WA158  
 75-95 Potters Road, Ondit, VIC

Figure  
**F1**



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**LEGEND**

- Work Authority Area - WA158
- Stages 5 and 6 Extraction Areas
- Haul Road
- Bund/ water control barrier RL120
- Stockpile Area
- Approved Limit of Extraction
- Approved Disturbance Boundary
- Contours mAHD
- Watercourse
- Waterbody

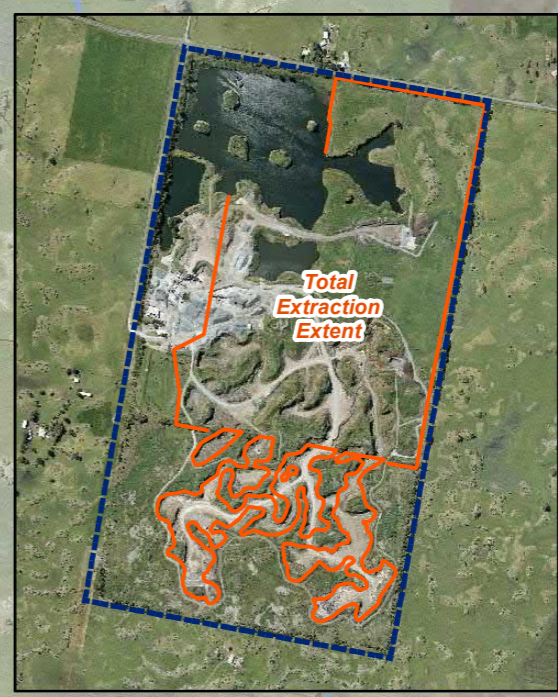
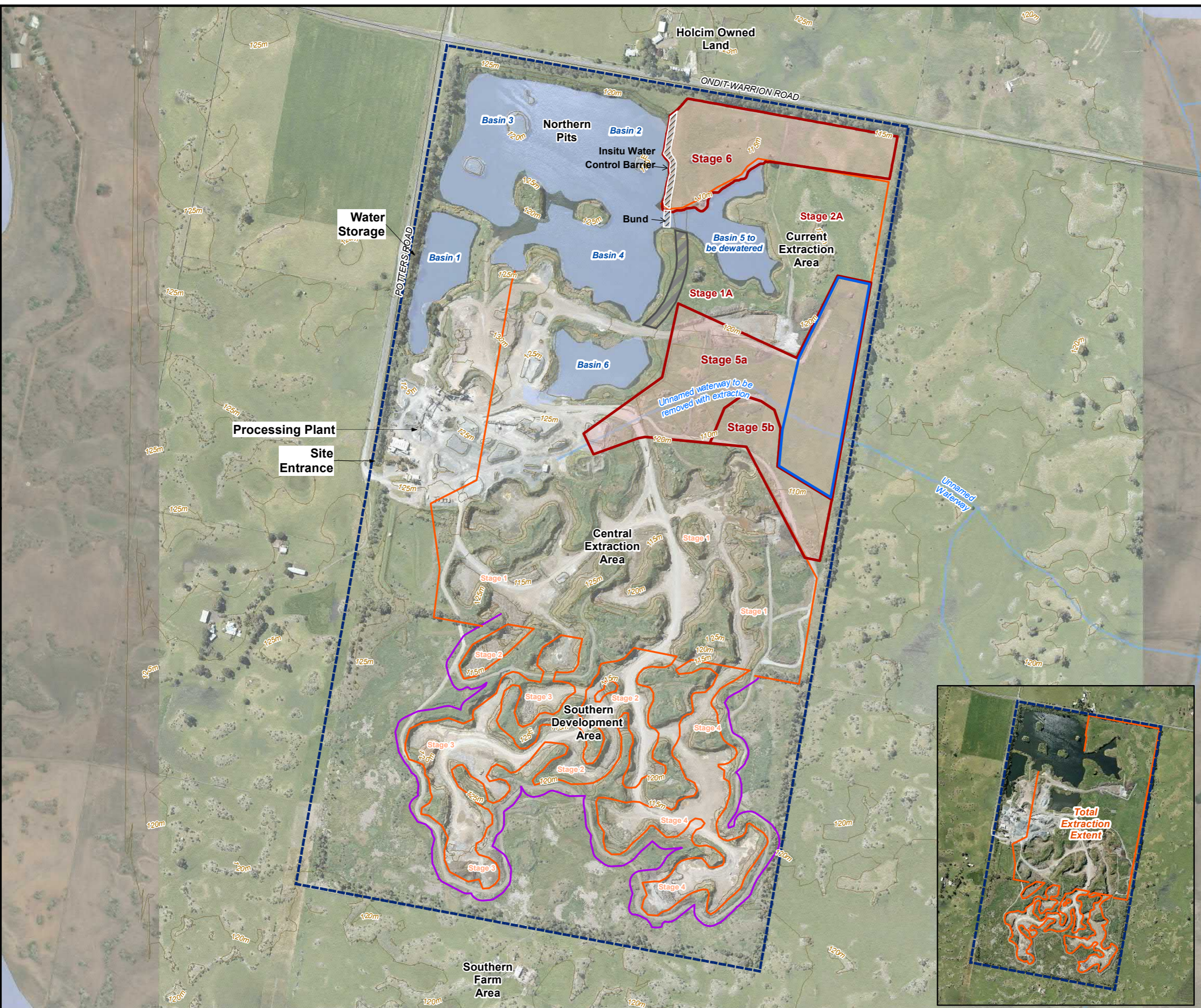
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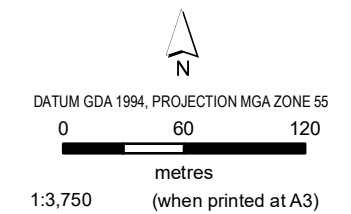
**SITE LAYOUT**

Holcim (Australia) Pty Ltd  
 Colac Quarry - WA158  
 75-95 Potters Road, Ondit, VIC

Figure  
**F2**



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**LEGEND**

- Work Authority Area - WA158
  - Stages 5 and 6
  - Assessment Area
  - Haul Road
  - Proposed Bund RL120
  - Approved Limit of Extraction
  - Approved Disturbance Boundary
  - Contours mAHD
  - Contour 118mAHD
  - Watercourse
  - MapshareVIC Current Mapped Wetland
- Corangamite Water Skink Records**
- Biosis Post-2016/17 Observations (Biosis 2018; 2020)
  - Biosis pre-2016/17 Observations (Biosis 2005; 2018; 2020)
  - AECOM 2017 Assessment
- Corangamite Water Skink Habitat**
- Optimal Habitat
  - Sub-Optimal Habitat

Data sources:  
 VicMap data:  
 Background Mapping Data Copyright The State of Victoria 2019. The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information Imagery: Nearmap (2019)



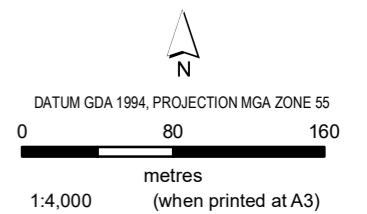
**CORANGAMITE WATER SKINK RECORDS**

Holcim (Australia) Pty Ltd  
 Colac Quarry - CWS MP  
 75-95 Potters Road, Ondit, VIC

Figure  
**F3**



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**LEGEND**

- Work Authority Area - WA158
  - Stages 5 and 6
  - Haul Road
  - Proposed Bund RL120
  - Approved Limit of Extraction
  - Approved Disturbance Boundary
  - Contours mAHD
  - Contour 118mAHD
  - Watercourse
- Corangamite Water Skink**
- Suitable Habitat (Stage 5 & 6)
  - Sub-optimal Habitat with historic record (Stage 5&6)
  - Pre-2016 Occupied Habitat (with buffer on CWS record)
  - Post-2016 Occupied Habitat (with buffer on CWS record)
  - Habitat Created 2008 for SDA
  - Habitat Offset created for habitat loss (to extent above 118mAHD)
  - Habitat Offset to be created during rehabilitation (indicative)
  - Supplementary Habitat Created to mitigate Water Level Increase

Data sources:  
 VicMap data:  
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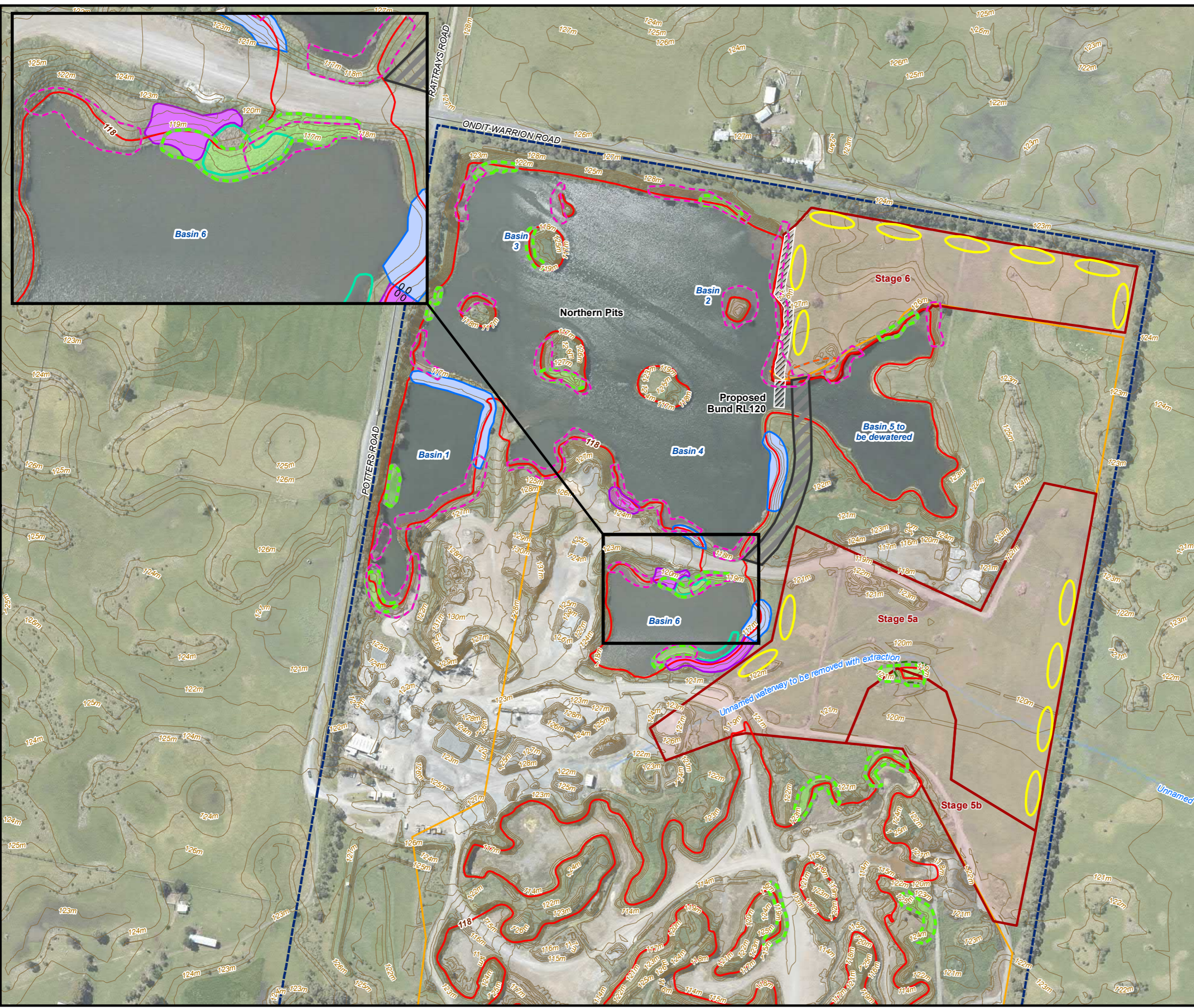


**CORANGAMITE WATER SKINK  
 POTENTIAL IMPACT  
 AND MITIGATION**

Holcim (Australia) Pty Ltd

Colac Quarry - Flora and Fauna  
 Assessment  
 75-95 Potters Road, Ondit, VIC

Figure  
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# Appendix B

Corangamite Water  
Skink Translocation Plan  
2010

HOLCIM COLAC QUARRY

Corangamite Water Skink  
Translocation Plan

September 2010

Report to Holcim Australia Pty. Ltd.

## HOLCIM COLAC QUARRY

### Corangamite Water Skink Translocation Plan

FINAL PLAN 10 September 2010

*prepared by*

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Document Information:		
Version/date	Internal review by	Date sent to client
Draft version 01	IS	21/05/10
Final version	-	

**File name:**

**11150.Colac.Quarry.CWS.Translocation.Plan.FIN01.10092010.doc**

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## ACKNOWLEDGEMENTS

Biosis Research acknowledges the contribution of the following people and organisations in preparing this plan:

*Holcim Australia Pty. Ltd.*

- Barry Hill

*Department of Sustainability & Environment, Victoria*

- Garry Peterson

*Biosis Research Pty. Ltd*

- Ian Smales for assistance and review

## ABBREVIATIONS

AEC	Animal Ethics Committee
DSE	Department of Sustainability & Environment, Victoria
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FFG Act	<i>Flora and Fauna Guarantee Act 1988 (Vic.)</i>
NRT	National Recovery Team
SDA	Southern Development Area
SFA	Southern Farm Area

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## 1.0 INTRODUCTION

### 1.1 Project Background

Biosis Research Pty. Ltd. was commissioned by Holcim Australia Pty. Ltd. to develop this Translocation Plan for the Corangamite Water Skink *Eulamprus tympanum marnieae* for its Southern Development Area (SDA; Figure 1).

In 2005 Biosis Research undertook a flora and fauna assessment of the SDA at Holcim's (then trading as Readymix) Colac Quarry (Biosis Research 2005). The extension of the quarry into the SDA was proposed. That report documented the potential for the Corangamite Water Skink to occur within the SDA.

In 2006 Biosis Research was commissioned by Holcim (then trading as Rinker Australia Pty. Ltd.) to investigate the extent of occurrence of, and habitat quality for, the Corangamite Water Skink at the Colac Quarry (Biosis Research 2006). That assessment determined that the extent of occurrence and available habitat within the SDA was limited to three locations where stony knolls provide a complex microhabitat with networks of crevices between rocks and in stony walls (Figure 2). Densities in these areas were low. Eleven Corangamite Water Skinks were recorded within the SDA; however the population was estimated to be approximately 15 animals.

In other parts of the quarry the extent of occurrence was more widespread and/or densities were higher. Within the Southern Farm Area (SFA) the extent of available habitat was more widespread with a larger number of stony knolls providing the complex microhabitat required (Figure 2). Eight Corangamite Water Skinks were recorded within the SFA.

The former quarry area in the north of the property consists of previously quarried and rehabilitated sections, a few unquarried knolls, pasture and some drystone walls. The floor of the former quarry is now flooded and forms a series of interconnected lakes. Rockpiles adjacent to the flooded quarry floor now provide suitable habitat for the skink while sheer stone walls provide basking habitat (Figure 2). A total of 22 Corangamite Water Skinks were recorded within the former quarry area; however the population was estimated to be at least 60 animals.

These investigations identified that areas containing a complex microhabitat of fractured and jumbled large rocks, with a shrub cover of approximately 10%, and close to water are of particular value to the Corangamite Water Skink as the humid conditions within crevices protect animals from desiccation, the crevices and shrubs provide foraging sites and protection from predation and exposed rocks provide basking sites. The presence of fringing vegetation further enhances the quality of the habitat. Where these habitat features are present, such as around the edges of

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the former quarry and in many of the drystone walls in the area, it is considered optimal habitat (Figure 2).

Other areas within the SDA and SFA provide a much less structurally diverse environment due to a lack of loose surface rock. Embedded rock is fractured into blocks with sub-surface crevices; however it is likely that loose surface rock has been removed historically to create the drystone walls in the area. Many of these areas are not adjacent to water and are likely to provide a drier microenvironment. They are also isolated from optimal habitat. Where this habitat type is present within the SDA and SFA it is considered sub-optimal habitat (Figure 2).

Monitoring of the Corangamite Water Skink population at Holcim's Colac Quarry has taken place in 2008-09 and 2009-10. No Corangamite Water Skinks were detected within the SDA in either survey. This is likely a result of the low density population within the SDA. The overall population throughout the quarry is thought to have remained stable.

In 2007 Biosis Research was commissioned by Holcim (then trading as Rinker Australia Pty. Ltd.) to develop a Management Plan for the Corangamite Water Skink and native vegetation offsets (Biosis Research 2007). This plan identified a number of objectives related to the management of vegetation and habitat for the Corangamite Water Skink within the SDA. One of the objectives of the management plan was to *"To salvage and translocate all Corangamite Water Skinks that are likely to be impacted by quarry operations"*. Actions associated with objective included the development of a detailed translocation/establishment proposal and methodology to be developed in consultation with the Department of Sustainability and Environment (DSE) and the Corangamite Water Skink Recovery Team.

This document outlines the objectives, methodology and reporting requirements for the translocation of Corangamite Water Skinks within the SDA at the Holcim Colac Quarry.

## **2.0 CORANGAMITE WATER SKINK**

The Corangamite Water Skink is considered to be Endangered under the federal *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), Threatened under Victoria's *Flora and Fauna Guarantee Act 1988* (FFG Act) and is listed as Critically Endangered on the DSE Advisory List of the Threatened Vertebrate Fauna in Victoria (DSE 2007).

The Corangamite Water Skink is a medium-sized member of the family Scincidae and is endemic to the Victorian Volcanic Plain. It is the only water skink occurring within the naturally treeless grasslands of south-eastern Australia (Robertson and

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Peterson 2010).

Prior to 1996 the species was known from three isolated populations at Lismore, Dreeite and the north-western shore of Lake Bolac. Populations at Lismore and the original Lake Bolac location are now thought to be extinct. Through recent surveys the species is now known from 29 sites representing 11 discrete extant populations. These extant sites are patchily distributed and isolated. These sites may have been connected by continuous habitat historically; however anthropogenic processes such as vegetation clearing, rock removal and hydrological changes to wetlands have led to severe fragmentation, and movement between known sites seems unlikely. Ongoing monitoring of the species has indicated that some extant populations continue to decline (Robertson and Peterson 2010). The conservation of the taxon is further complicated by the fact that it is now known to be comprised of two genetic lineages (northern and southern) (Scott and Keogh 2003).

The Corangamite Water Skink inhabits stony knolls and rises with deeply fissured sub-surface basalt rock, scattered surface rock and remnant vegetation (particularly Tree Violet *Melicytus dentata*) close to permanent or ephemeral wetlands. Microhabitat consisting of deep rock fissures and large rock aggregations with many crevices below or under rocks, often in areas with high shrub cover and close to dense vegetation, is preferred. This microhabitat provides cool, moist environments allowing the species to inhabit the basalt plains of Victoria which would otherwise be intolerable for the species through the heat of summer. Juveniles inhabit slightly different microhabitats to adults; small areas of scattered rock and dense vegetation. Optimal habitat is located in close proximity to water (Robertson and Peterson 2010).

The main threats to the Corangamite Water Skink include continued habitat loss and ensuing fragmentation, associated isolation of populations and sub-populations, and degradation of habitat (Robertson and Peterson 2010). Most populations of the Corangamite Water Skink are associated with private land that is used for agricultural purposes. Removal of habitat, particularly the ripping of rock, to increase productive land not only results in a loss of habitat but is likely to further isolate populations or sub-populations through removal of dispersal routes. Heavy grazing of native vegetation, particularly Tree Violet, is of concern as these species can form part of the dietary and cover requirements for the species. Heavy grazing is also likely to impact juveniles that rely on heavily vegetated areas. Changes to hydrological regimes through the draining of wetlands and extraction of ground water, in conjunction with continued drought, has resulted in the drying of a number of waterbodies associated with the species (Robertson and Peterson 2010).

### **3.0 OBJECTIVES**

A National Recovery Plan for the Corangamite Water Skink 1998-2003 (Robertson

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1998) was developed to detail the recovery objectives and actions necessary for the species' long term survival. This plan has now been revised and the draft is available for comment (Robertson and Peterson 2010). The National Recovery Plan outlines a number of recovery objectives, criteria and actions to be implemented to ensure the long term survival of the species throughout its extant range (Robertson and Peterson 2010). Objective 6 – Salvage and Translocation states that:

*“Currently the NRT (National Recovery Team) believes that the removal of lizards from the wild for salvage purposes should be considered only as an absolute last resort. However, periodically, development decisions may cause sites supporting populations of E. t. marnieae to be unavoidably destroyed. If such developments proceed then contingencies must be made to minimise effects on the overall conservation of E. t. marnieae. One possible contingency is the salvage of animals . . . for potential translocation to other sites . . . A protocol must be established for their conduct (Robertson and Peterson 2010, p.32).*

The present plan has been developed with a view to meeting the performance criteria of the National Recovery Plan, namely that a methodology for undertaking the translocation has been developed.

Further this plan seeks to meet the requirements of DSE and the Corangamite Water Skink National Recovery Team with the following objectives:

1. To develop a suitable methodology for the capture and relocation of Corangamite Water Skinks.
2. To ensure that suitable release sites are present and identified.
3. To develop a protocol for monitoring of translocated Corangamite Water Skinks.
4. To salvage and translocate all Corangamite Water Skinks that are likely to be impacted by quarry operations.
5. Obtain all legal/permit and Animal Ethics Committee (AEC) requirements for all of above.

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## 4.0 PRE-SALVAGE REQUIREMENTS

The following relates to matters that must be in place prior to commencement of any salvage operation:

- In order for direct translocations to be effected, salvage can occur only during the period of the year when the Corangamite Water Skink is routinely active (September to May). However to increase capture rates and thus salvage and translocate all Corangamite Water Skinks likely to be impacted by quarry operations salvage will be undertaken during October and November when gravid females are basking more often to ensure foetal development. This time, prior to birth of the annual cohort of juveniles, can also be expected to coincide with the lowest number of animals in the population's annual cycle. During the cooler months when the species is inactive, salvage and translocation cannot be undertaken.
- No construction earthworks in areas of identified habitat within the SDA (Figure 2) may commence until Biosis Research provides written confirmation that salvage is complete.
- Prior to salvage being undertaken annual monitoring of the Corangamite Water Skink population at Holcim's Colac Quarry will be undertaken as per the Management Plan (Biosis 2007). Targeted survey will be conducted within the SDA to identify the locations of animals and determine whether additional areas, not previously identified, are currently inhabited by animals. Surveys within the SDA will be aimed at ensuring all Corangamite Water Skinks that are likely to be impacted by quarry operations are located and that salvage is undertaken in these areas.
- Salvage will not commence until the areas identified for release have been surveyed and assessed for suitability for release. Identified release sites are habitat that has been created as part of the management plan and that have had a period of 'settling' to allow their colonisation by appropriate invertebrate prey species for Corangamite Water Skinks and for the establishment of appropriate surrounding vegetation (Biosis Research 2007).
- Further areas identified for release will be surveyed prior to translocation being undertaken to identify whether these areas have been naturally colonised by Corangamite Water Skinks. If they have, they will generally be deemed unsuitable as release sites due to the territorial nature of the animals and the expectation that resident Water Skinks would prevent newly released individuals from establishing at the site.

In addition to the items listed above, issues around authorisation, occupational health and safety, and identification and preparation of release sites must be

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addressed prior to any salvage and translocation.

## 4.1 Authorisation

A Management Authorisation (permit) under provisions of the *Wildlife Act 1975* will be required to be issued by DSE to consultant zoologists to allow the proposed salvage, translocation and post-release monitoring of Corangamite Water Skinks outlined in this plan.

The DSE permit cannot be issued without the prior approval of an Animal Ethics Committee.

Note: the removal or relocation of any other native fauna species will require a separate permit issued by DSE under provisions of the *Wildlife Act 1975*.

## 4.2 Occupational health and safety

Salvage teams will adopt adequate safety measures applicable to the location. These measures include, but are not limited to:

- Holcim's Colac quarry is a working quarry and all salvage personnel are required to undergo a site induction and adhere to all site OH&S requirements.
- Staff must wear protective clothing. The minimum standard is a high visibility safety vest, hard hat and steel capped safety boots, but could also include such items as gaiters, ear plugs and safety glasses or any other equipment to meet the specific site OH&S requirements.
- All vehicles driving within the quarry must have an operational flashing beacon located on top of the vehicle.
- All salvage personnel shall be inducted by Holcim prior to working on the site and to safety procedures specific to the salvage operation by Biosis Research Pty. Ltd.

Biosis Research Pty. Ltd. has all the necessary insurance cover for its staff members: Professional Indemnity Insurance, Public Liability Insurance, Workers Compensation Insurance, and Workcover employment number 5755554.

## 4.3 Release Sites for Salvage and Translocation

Holcim is currently undertaking habitat creation works within the former quarry (Figure 3) as part of the Management Plan for the Corangamite Water Skink (Biosis Research 2007). This work involves the creation of 50 linear metres of new habitat for the Corangamite Water Skink adjacent to the expected final water level of the waterbodies created within the former quarry site each year for five years. Habitat is being created through the placement of rock overburden from quarry

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operations along the water's edge to a minimum width of 5 metres, extending into the water approximately 1.5 metres and to a depth of approximately 1 metre. Crevices are being retained between a high proportion of the rock overburden and through the vertical matrix to provide refugia for the skinks.

All translocation of skinks will be to an area of created habitat within the former quarry site (Figure 3). No translocation of animals to external sites will be undertaken. This created habitat was chosen as the release site for translocation due to a number of factors:

- Habitat creation works are targeted to provide habitat that meets the specific habitat requirements of the Corangamite Water Skink. Thus animals will be translocated to areas of suitable habitat.
- Known habitat within the range of the Corangamite Water Skink is likely to be currently occupied. The species is highly territorial and translocation to sites with existing populations is unlikely to be successful due to the likelihood of antagonistic encounters between animals, and the potential for such encounters to result in the death of animals. To date no evidence of occupation of newly created habitat has been observed, reducing the likelihood of antagonistic encounters once animals are translocated.
- The Corangamite Water Skink is known to disperse into and colonise artificial habitat, as evidenced by the number of skinks within the former quarry site (Biosis Research 2006). The former quarry now supports a minimum of 22 Corangamite Water Skinks, but based on the extent of potential habitat the population is thought to be at least 60 animals. The rock structure, proximity to water and presence of native vegetation within the former quarry indicates that this is optimal habitat, and translocation of skinks to currently unoccupied areas within the former quarry will further augment this established population. Natural colonisation by Corangamite Water Skinks of habitat inadvertently created around the edges of previously quarried areas provides evidence that translocation is feasible and can be expected to succeed.

#### **4.3.1 Preparation of release sites**

Prior to commencement of salvage and translocation the following works must be completed.

- As per the Management Plan created habitat must be completed at least 12 - 24 months prior to the commencement of the translocation process. This includes all placement of rock overburden and revegetation work.
- Survey of release sites must be conducted immediately prior to translocation to ensure that they have not been colonised, as the presence of skinks may



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result in antagonistic territorial behaviour on the part of resident skinks which are likely to result in mortality of translocated animals. Any such sites that have been colonised should not be used for translocation.

Annual monitoring in 2009-10 identified areas of created habitat considered suitable for the release of translocated animals.

## **5.0 SALVAGE OF CORANGAMITE WATER SKINK**

Note: this salvage plan relates only to the Corangamite Water Skink and does not cover the capture or handling of other indigenous species.

### **5.1 Areas to be Salvaged**

Three areas previously identified as providing sub-optimal habitat for the Corangamite Water Skink within the SDA will be impacted as a result of quarry operations (Figure 3). Eleven Corangamite Water Skinks were recorded within these areas (Biosis Research 2006). These areas will be targeted for salvage and translocation.

### **5.2 Salvage of the Corangamite Water Skink**

Salvage of the Corangamite Water Skink must occur prior to any quarry operations within areas identified in Figure 3 that may disturb stony rises or adjacent areas. Written confirmation of completion of Corangamite Water Skink salvage to the satisfaction of Biosis Research and/or DSE must be received before any quarry operations can commence within 50 metres of these areas.

The Corangamite Water Skink inhabits stony rises and is inherently difficult to trap and thus salvage. Previously sticky traps have been used to sample the Corangamite Water Skink with success (G. Peterson pers. comm., Goodman and Peterson 2005); however changes to the *Prevention of Cruelty to Animals Regulations 2008* (Section 53) have seen the use of these traps limited to the commercial pest control industry. An alternative method for sampling lizards in rocky environments will be utilised, and this method is outlined in Goodman and Peterson (2005).

Two days of pre-salvage survey for the Corangamite Water Skink will be undertaken across the quarry site. These surveys will aim to locate all Corangamite Water Skinks that are likely to be impacted by quarry operations and ensure that created habitat within the former quarry proposed as a recipient site, is not already colonised by large numbers of skinks. This time will also be used to assess the habitat suitability within the SDA and ensure all areas of suitable habitat have been identified.

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If areas not previously identified as suitable habitat are located and skinks are recorded in these areas additional trapping will be required. This will be either through the use of additional traps or through additional days of trapping in these areas.

Two qualified zoologists will place out a total of 8-10 traps (4-5 traps per person) across the three habitat areas. Traps will be micro-sited in likely habitat (i.e. close areas of complex rock structure and near Tree Violet) unless an animal is observed, in which case traps will be sited at this location. Traps will be placed between adjacent rocks or in a suitably sized crevice ensuring the lip of the trap is level with surrounding rocks. To prevent heat stress to animals and exposure to predators, traps will be placed beneath shrubs where possible or will have refugia placed into traps (Goodman and Peterson 2005). Traps will be placed out by 9am and monitored until 6pm each day when they will be closed or taken away.

Any Corangamite Water Skinks caught during salvage operations will be immediately transferred to securely tied, dry cloth bag and immediately placed into a Styrofoam box to prevent heat stress and desiccation to animals. The position of all locations where Corangamite Water Skinks are found will be recorded using a hand-held GPS unit and scribed onto the datasheet (Appendix 1).

Trapping will be undertaken for a minimum of four days. If more than two Corangamite Water Skinks are trapped during the final two days of the salvage period trapping will continue no skinks are caught on the final day. At this time the salvage effort will be considered suitable.

## **5.3 Translocation and release of the Corangamite Water Skink**

### **5.3.1 Health evaluation of salvaged Corangamite Water Skinks**

At the point of salvage the health of all animals will be assessed by Biosis Research zoologists and detailed on the data sheet (Appendix 1). Any animals with injuries other than an autotomised tail will be taken to a qualified wildlife veterinarian for assessment of condition and/or treatment before they can be released. Health management of any such animals will be the responsibility of the veterinarian.

### **5.3.2 Corangamite Water Skink mortalities**

Any Corangamite Water Skinks killed or found dead as a result of the salvage operation will be provided to Museum Victoria. They will be labelled with the date, location and details of collector. Biosis Research or Garry Peterson (DSE Warrnambool) should be immediately notified to enable collection of any animals

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killed or found dead during subsequent quarry operations.

### **5.3.3 Photographs for identification of individuals**

Prior to release a high quality photograph of the ventral surface of each animal will be taken and the photograph number recorded on the datasheet (Appendix 1). It will also include a millimetre scale and a unique number for each individual (equivalent to the “Capture #” field on the datasheet). Previous studies have shown that Corangamite Water Skinks possess a unique pattern ventral marking and that individuals can be identified from the patterns on the throat, chest and abdomen (G. Peterson, pers. comm.). Photographs of ventral surface of all captured Corangamite Water Skinks will be taken to enable individual identification of animals if required.

### **5.3.4 Translocation**

It is important for transport and release of salvaged Corangamite Water Skinks to occur with minimal delay and consequent stress on the animals.

All lizards salvaged will be held in securely tied, dry cloth bags and placed into a Styrofoam box during transport and until such time as they are released or delivered into the care of a veterinarian.

Healthy animals will be transported for release at a designated recipient site as soon as practicable, and after ventral photographs have been taken (see above). If animals are captured prior to 3pm they will be released during the same day. If they are captured after 3pm they will be kept overnight and released first thing the following morning. All animals will be released only during conditions that are appropriate for them to be active and able to rapidly find refuge sites at the recipient site.

Note that salvage and translocation will only be feasible during the warmer period of the year when animals are active and direct translocation is possible.

### **5.3.5 Release site and procedures**

All salvaged and translocated skinks will be released at a designate release site within Holcim’s Colac Quarry (Figure 3) consisting of habitat created as a part of the Management Plan (Biosis Research 2006). Salvaged Corangamite Water Skinks will be released at a recipient site as soon as practicable. All animals will be released only during conditions that are appropriate for them to be active and at a time of day that allows them opportunity to find refuge sites at the recipient site.

Due to the risk of antagonistic encounters animals will be progressively released in

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different parts of the recipient site, with a minimum distance of five metres between concurrently released animals.

The numbers, identification information and precise locations of all releases will be documented.

## 5.4 Incidental salvage during quarry operations

Although a thorough search will have been completed during the pre-construction Corangamite Water Skink salvage works, it is still possible that additional animals may be uncovered by Holcim during quarry operations. It has been our experience at other development projects that most earthworks contractors are willing to assist in incidental salvage during this phase and on a number of occasions further animals have been salvaged.

Holcim employees will be requested to collect any Corangamite Water Skinks they find during quarry operations. They will be inducted on these requirements and identification of the species and given an information leaflet of the species (Appendix 2). Under no circumstances should Holcim employees attempt to capture an animal unless it has been confirmed that it is not a snake.

Note: **quarry operations do not need to cease** in the event that a Corangamite Water Skink is found. The animal should be collected, immediately placed in a securely tied, dry cloth bag and stored in a cool, dry and safe location. The contractor should notify Biosis Research zoologists who will then contact Garry Peterson (DSE). A zoologist will attend the site and the animal will be re-located to a designated release site upon instruction.

In the unlikely event that incidental salvage of an animal occurs in winter the animal will need to be held until the following spring. Animals will need to be transported to Melbourne Zoo and held by the herpetology department there. Holcim will be required to reimburse Melbourne Zoo for their time and costs associated with this activity.

## 6.0 POST-RELEASE MONITORING

### 6.1 Objectives

The primary objective of monitoring of recipient sites following release will be to determine the success of translocation and release. This will be quantified by:

- The colonisation of created habitat, presumably by translocated animals;
- The ongoing presence of animals within created habitat over successive years; and

- 
- An increase in the numbers of animals observed within created habitat, up to an expected carrying capacity, during annual monitoring.

A secondary objective will be to obtain information about dispersal of animals from release locations.

## **6.2 Timeframe**

As per the Management Plan for the Corangamite Water Skink (Biosis Research 2007) monitoring of the Corangamite Water Skink population within the quarry will be undertaken annually for a period of ten years following commencement of quarrying operations.

Quarrying operations within the SDA began in late 2009. The first year of post-commencement monitoring was undertaken in 2009-10. Annual monitoring will continue until 2018-19.

## **6.3 Methodology**

Annual monitoring of translocated Corangamite Water Skinks will be undertaken concurrently with annual monitoring of the Corangamite Water Skink population within Holcim's Colac Quarry.

Methodology for monitoring of skinks is contained in Biosis Research (2006) and based upon protocols outlined in Peterson (2000).

## **7.0 REPORTING**

Written confirmation of the conclusion of salvage works will be provided to Holcim Pty. Ltd. No quarry operations within areas of Corangamite Water Skink habitat (Figure 2 and 3) shall be undertaken until clearance is provided.

The results of all salvage, translocation and post-release monitoring will be documented to DSE requirements annually and provided to Senior Land Use Planner (DSE Ballarat), Senior Biodiversity Officer – Threatened Species (DSE Warrnambool), the Corangamite Water Skink NRT and the proponent. This will include baseline information about spatial and habitat usage of the study area that may result from assessment of habitat information collected prior to salvage combined with results of the salvage operation.

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# APPENDICES



## APPENDIX 1

### Corangamite Water Skink Salvage and Translocation Datasheet

<b>Date:</b>	<b>Observer/s:</b>
<b>Site location:</b>	Holcim's Colac Quarry – Southern Development Area
<b>Start Time:</b>	<b>End Time:</b>

<b>Temperature (start):</b>	<b>Temperature (end):</b>
<b>Wind Direction (start):</b>	<b>Wind Direction (end):</b>
<b>Wind Speed (start):</b>	<b>Wind Speed (end):</b>
<b>Sun (start):</b> Direct Breaks Filter	<b>Sun (end):</b> Direct Breaks Filter
<b>Cloud (start):</b>	<b>Cloud (end):</b>

<b>Salvage Area (from Figure 3):</b> S1 S2 S3 Other (UTM):
<b>Number of traps set:</b>
<b>Captures (#):</b> (Detail below)

#### CAPTURE DETAILS

<b>Capture #</b>	<b>Species</b>	<b>Type</b> (AD=Adult, GF=Gravid female, SA=Sub-adult, J=Juvenile)	<b>Capture Location (UTM)</b>	<b>Release Site (UTM)</b>	<b>Health Okay?</b> (if not detail below)	<b>Head Shot #</b>

NOTES:



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## **APPENDIX 2**

### **Corangamite Water Skink Information Leaflet**

**Corangamite Water Skink *Eulamprus tympanum marnieae***

**EN, CR, L**

The Corangamite Water Skink is a nationally threatened species. It is listed as **Endangered** under the *Environment Protection and Biodiversity Conservation Act 1999*, **Critically Endangered** on DSE Advisory List of Threatened Vertebrate Fauna (DSE 2007) and is listed as Threatened under Victoria's *Flora and Fauna Guarantee Act 1988*.



Photograph Copyright © Peter Robertson, Wildlife Profiles

**General Appearance**

The Corangamite Water Skink grows up to 100 mm snout-vent length with a tail length of up to 150 mm. The dorsal colouration is generally pale olive to dark yellowish brown on the body, head, limbs and tail, overlain with black markings. The upper lateral zone is black with one to three rows of irregular pale specks. The lower lateral zone is pale grey or yellow.

This species is distinguished from the Southern Water Skink *Eulamprus tympanum tympanum* by the black dorsal markings

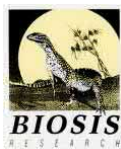
**Habitat**

The Corangamite Water Skink inhabits stony knolls and rises with deeply fissured sub-surface basalt rock, scattered surface rock and remnant vegetation (particularly Tree Violet *Melicactus dentata*) close to permanent or ephemeral wetlands.

Within the Holcim Colac Quarry this species is known to inhabit the former quarry site, the Southern Development Area (SDA) and the Southern Farm Area. Habitat has been set aside within the former quarry and the SDA specifically for the management of this species, and this area is now fenced off and habitat has been created.

**What should you do if you find a Corangamite Water Skink?**

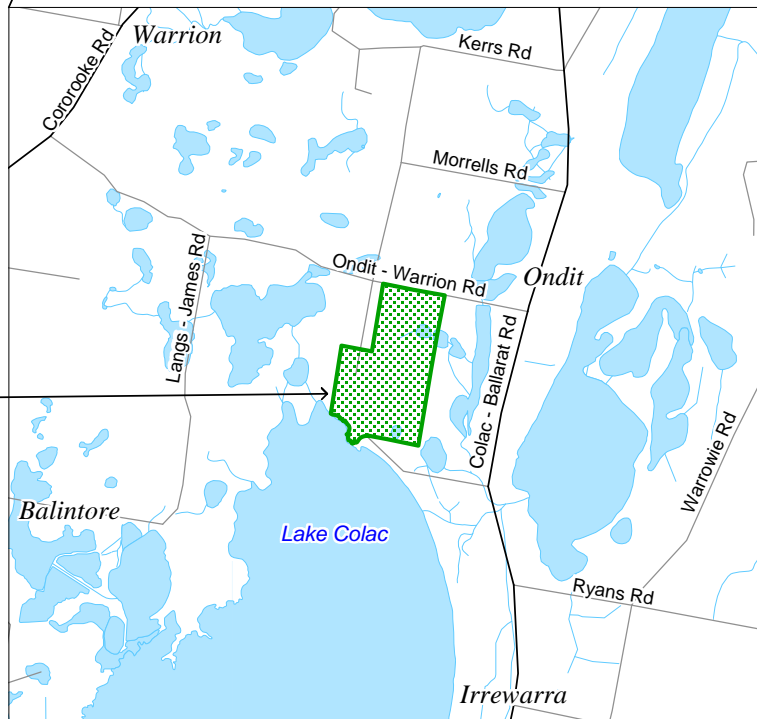
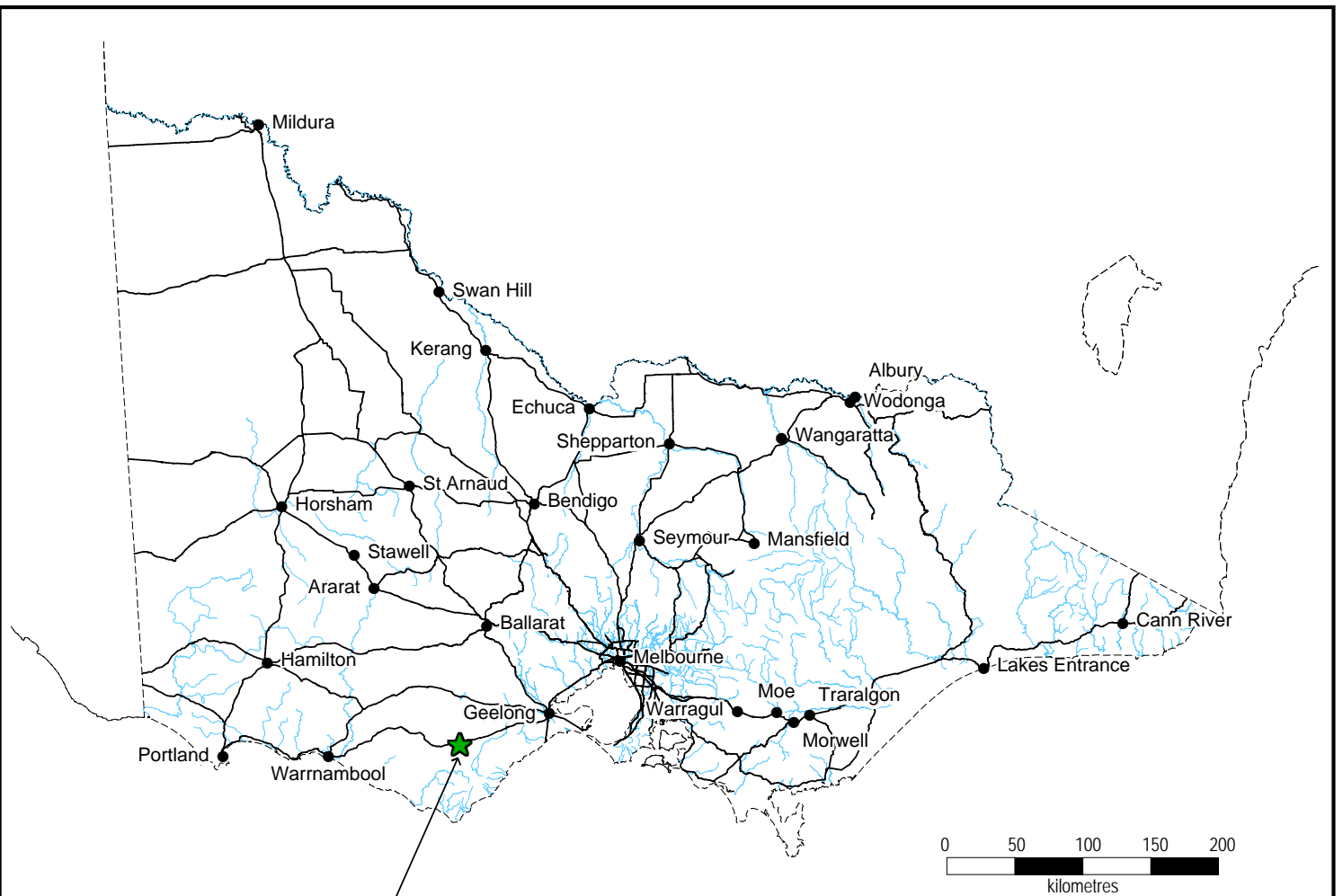
- 1) Collect the animal and place in a dry cloth bag (inside out to prevent entanglement in loose threads).
- 2) Place the bag in a safe, cool location.
- 3) Call Garry Peterson (DSE) on 03 5561 9915 or 0427 592 999. Seek approval for immediate release into designated release site.



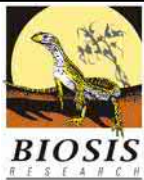
Biosis Research Pty. Ltd. A.B.N. 65 006 175 097 A.C.N. 006 175 097  
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# FIGURES



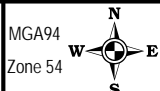
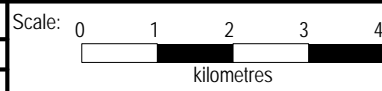
Acknowledgement: VicRoads  
 © State of Victoria, Department of Sustainability and Environment, 2007  
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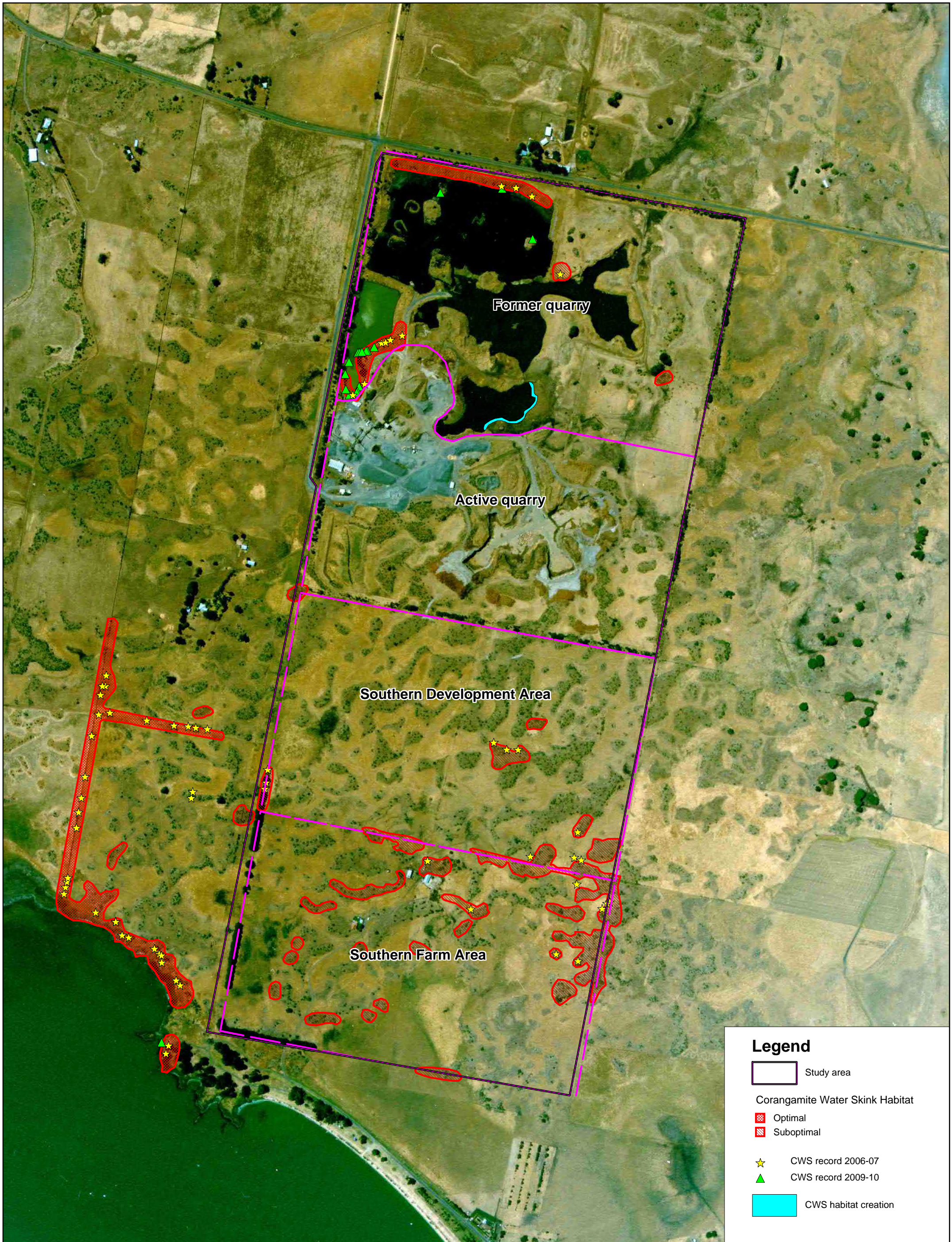


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Figure 1: Location of the study area

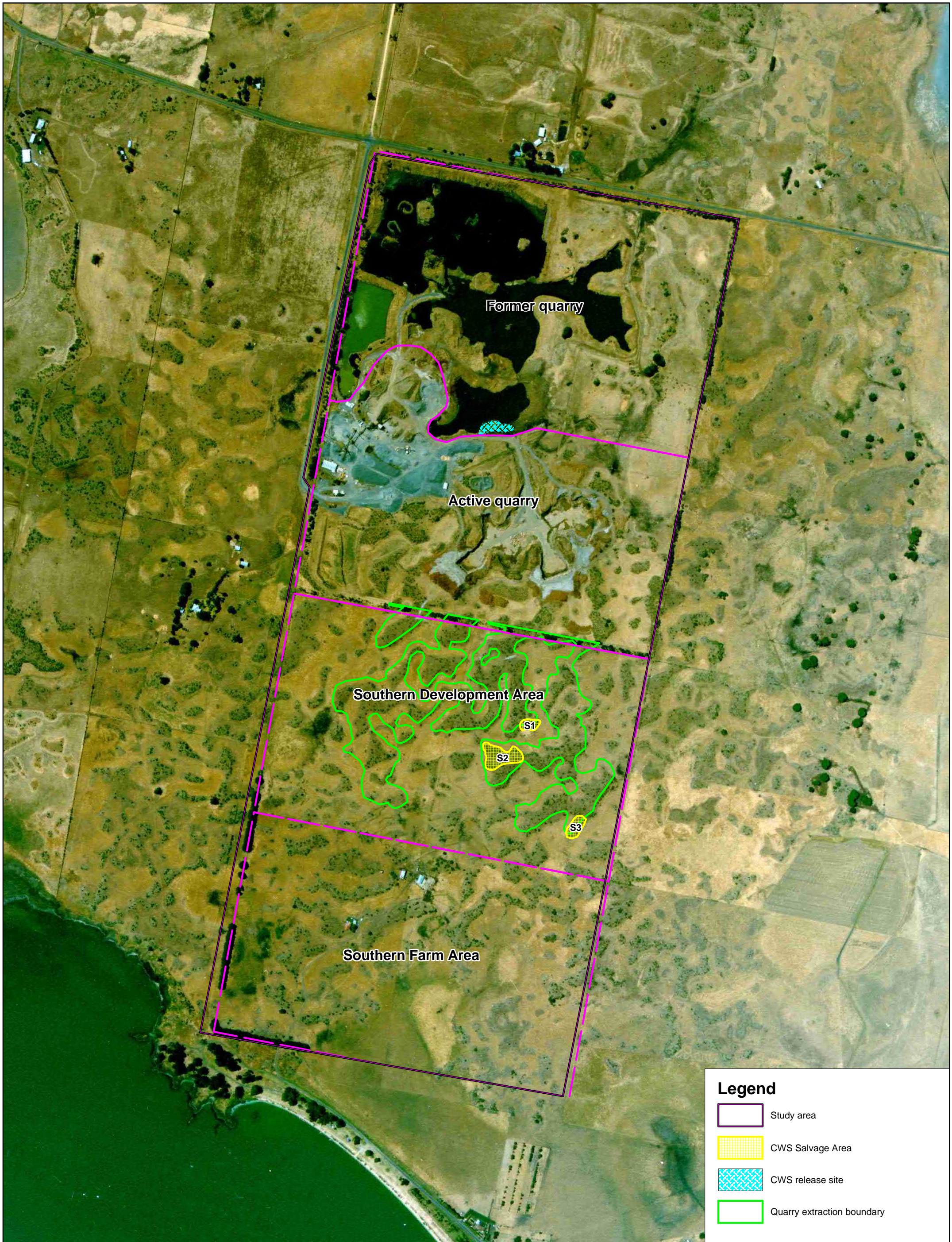
DATE: 20 May 2010  
 Checked by: NMC Drawn by: PJY File number: 11150  
 Location: . . . 11150\Mapping\11150 Figure 1.wor





**Legend**

- Study area
- Corangamite Water Skink Habitat
  - Optimal
  - Suboptimal
- ★ CWS record 2006-07
- ▲ CWS record 2009-10
- CWS habitat creation



**Legend**

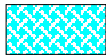

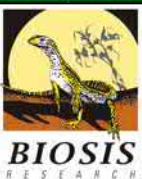
-  Study area
-  CWS Salvage Area
-  CWS release site
-  Quarry extraction boundary

Figure 3: Salvage and release sites within Holcim's Colac Quarry

DATE: 20 May 2010  
 Checked by: NMG | Drawn by: NMG | File number: 11150  
 Location: ...11150\Mapping\11150 Fig 3.wor

Scale: 0 75 150 225 300 375  
 kilometres



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