



WETLAND REHABILITATION PLAN

Coondaree Swamp

Lots 7 and 19 Copley Road and 100 Great Northern Highway

Upper Swan

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SUMMARY

Coondaree Swamp (12.4ha) is located within Lots 7 and 19 Copley Road and 100 Great Northern Highway, Upper Swan. These lots are owned by Midland Brick Pty Ltd (Midland Brick). (Midland Brick) has previously excavated clay from part of Coondaree Swamp (pits 1 to 3), and has approvals to re-mine these areas and mine the eastern section of the swamp. Before works commence a Wetland Rehabilitation Plan for Coondaree Swamp needs to be prepared for the wetland area.

In accordance with Minister for the Environment Statement No.699, Condition M7.1 the main objectives of this rehabilitation plan are to:

- Provide a detailed vegetation and flora survey of the impacted areas.
- Identify habitat area that may be impacted.
- Describe the measures that will be implemented to progressively rehabilitate the wetland.
- Identify ongoing monitoring and maintenance requirements for the wetland.

Mining of Coondaree Swamp will be undertaken in stages over approximately 18 years.

In 2007, 29 plant taxa were recorded across the site with 11 of these taxa being exotic (weed) species. This species list has been used to assist in the development of a species list for the rehabilitation of Coondaree Swamp once mining has been completed.

Prior to mining, seeds from native species will be collected for use in the seed mix to be applied to the site as part of the rehabilitation process. It is recommended that tube stock and seeds consisting of a range of trees, shrubs and herbs be planted. As part of the rehabilitation process various habitat types will also be developed.

Monitoring of the success of revegetation (plant survival and weed occurrence) against identified criteria will occur for several years.

The hydrology of the wetland area will also be managed and monitored.

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APPENDIX 2: Ministerial Statement 699
APPENDIX 3: Previous Environmental Assessments and Reports

1.0 INTRODUCTION

1.1 Overview

Coondaree Swamp is located within Lots 7 and 19 Copley Road and 100 Great Northern Highway, Upper Swan (Figure 1). These lots are owned by Midland Brick Pty Ltd (Midland Brick).

The Coondaree Swamp Wetland Rehabilitation Plan covers the wetland area identified in Figure 1, which is approximately 12.4ha. The wetland characteristics (including wetland boundary) and proposed use was identified in RPS BBG (2004) Section 46 review report which was approved by the Minister for the Environment in 2005 (Appendix 1).

On completion of a Level 1 (EPA 2004) Vegetation and Flora assessment for the area in 2007 (refer to Section 2.5), an additional area supporting vegetation associated with wetland areas has also been included within the Rehabilitation Plan.

1.2 Project Background

Clay has previously been excavated from Coondaree Swamp by a former site operator prior to Midland Brick's purchase of the site. Midland Brick plan to re-mine these areas in the western section of the Swamp and also mine the eastern section.

Approval for this activity was granted by the Minister for the Environment (Statement No.699 [previously Statement 251]), subject to Ministerial Conditions of which many have been satisfied. However, Condition M7.1 requires that prior to the re-commencement of ground-disturbing activities that a Wetland Rehabilitation Plan for Coondaree Swamp be prepared (see Appendix 2).

1.3 Rehabilitation Plan Objectives

In accordance with Condition M7.1 the main objectives of this rehabilitation plan are to:

- Provide a detailed vegetation and flora survey of the impacted areas.
- Identify habitat area that may be impacted.
- Describe the measures that will be implemented to progressively rehabilitate the wetland.
- Identify ongoing monitoring and maintenance requirements for the wetland.

I.4 Previous Environmental Documentation

Since the late 1990's, there have been numerous environmental assessments and reports covering Coondaree Swamp and adjacent land, some of these are presented in Appendix 3. These documents provide background information on the site.

2.0 CURRENT ENVIRONMENT

2.1 Climate

A relevant environmental factor for management of the wetland area is consideration of rainfall, which is approximately 739 mm of per year at Upper Swan.

2.2 Geomorphology, Soils and Topography

2.2.1 Overview

Coondaree Swamp is identified on regional geological mapping as containing Holocene swamp deposits, Silt (M₁) comprising grey mottled yellowish brown, blocky, firm silt of variable clay content. Soils immediately surrounding the Coondaree Swamp boundary are mapped as Pebbly Silt (MgS₁), Guildford Formation deposits of Pleistocene age, comprising strong brown pebbly silt, with common, fine to occasionally coarse grained laterite quartz, weathered granite pebble and some fine to medium grained sand of alluvial origin (Gozzard, 1986).

With the exception of the historical clay pits, ground elevation generally varies between 19 and 22m AHD in the locality of Coondaree Swamp (refer to Figure 1).

2.2.2 Excavation Pits

Existing dimensions of the 3 pits located within the Coondaree Swamp area are presented in the Sections below.

2.2.2.1 Pits 1 and 2

The current depth of these pits are unknown, however depth of water within the pits has been estimated at approximately 7 to 8m. They will require fill with overburden after the proposed excavation has been completed to achieve an optimum, safe batter slope.

2.2.2.2 Pit 3

The base of the pit is at approximately 15-16m RL with the depth of water approximately 2-3m.

2.3 Acid Sulfate Soils

In 2005, an Acid Sulfate Soil (ASS) Investigation and Management Plan was undertaken in accordance with draft environmental conditions proposed for inclusion in Ministerial Statement 699 (RPS BBG, 2005). Conclusions of this investigation were that:

- Confirmatory laboratory results indicate that reduced inorganic sulfur (i.e. SCR) is absent from all soil type associations recovered from beneath Coondaree Swamp.
- Slightly elevated titratable potential acidity (TPA) results in 4 of the 34 samples analysed appear attributable to organic acidity and should not require precautionary treatment or management measures. Excess buffering capacity also exists in these soil horizons.
- The overall results indicate that clay excavation operations should be able proceed as proposed across the entire site without implementation of special treatment and/or management precautions.

The DEC approved the RPS BBG (2005) ASS Investigation and Management Plan on 16 January 2006 (ref. 1458/05).

2.4 Surface Hydrology, Groundwater and Wetlands

Coondaree Swamp is a localised depression which retains some seasonal (winter) rainfall due to the clay nature of the underlying substrate (RPS BBG, 2004).

Current groundwater mapping (DoE, 2005) does not provide coverage of the site. Indicative geological mapping data for the site suggests an approximate depth to groundwater of 10mbgl (Gozzard, 1986). This concurs with anecdotal data collected during previous investigations of the site (BBG, 1997), which suggests watertable levels vary between 10 and 15mbgl in the locality. In 2005, 3 groundwater monitoring bores (CSMB 1, 2 and 3) were installed on site. Groundwater levels recorded within the monitoring bores were 9.1mbgl, 9.7mbgl and 10mbgl respectively.

Groundwater flow, where present, is expected to occur in a general southerly direction towards the Swan River.

There is an open drain which transverses the site along the boundary of Lots 100, 19 and 7.

2.5 Vegetation and Flora

2.5.1 General

Since the time of clearing (over 25 years ago), a monoculture of vegetation has regrown in the unmined portion of Coondaree Swamp, and is now limited to relatively mature specimens of *Melaleuca terretifolia*. Through the uniform height and size of the specimens, all plants appear to be of very similar age and are most likely regrown from root stock left at the time of clearing. It is logical to assume that once these specimens expire the vegetation of the eastern side of the swamp will be significantly and permanently reduced without active rehabilitation.

On the western side of the swamp where mining has occurred, some natural re-colonisation has occurred. The occurrence of the occasional *Eucalyptus (Eucalyptus rudis)* and scattered intervals of *Juncus* is evident around the edge of the open wetland.

Details of more specific survey are provided in the following sections.

2.5.2 Site Survey

2.5.2.1 General

A flora and vegetation survey of Coondaree Swamp was conducted by RPS botanists on 30 April, 2007. Survey methodology was based on a Level I Flora and Vegetation Survey as outlined in Guidance Statement 51 (EPA, 2004).

A Level I Survey comprises of:

Background Research or Desktop Study

- I. Gather together background information on the target area

Reconnaissance Survey

- I. Verify accuracy of the background Study
- II. Delineate and characterise the flora and range of vegetation units present in the target area
- III. Identify potential impacts

This involves selective, low intensity sampling of flora and vegetation to produce maps of vegetation units and vegetation condition at an appropriate scale.

2.5.2.2 Vegetation Sampling

Mapping of each vegetation unit was completed using aerial photographs and on site surveying. Each vegetation unit was defined by the dominant plant species (>2% cover) throughout its extent, using the vegetation structure classes of Western Australian Planning Commission (2000) (Table I).

Table 1: Vegetation Structure Classes

Life Form/ Height Class	Canopy Cover (percentage)			
	100% - 70%	70% - 30%	30% - 10%	10% - 2%
Trees 10-30m Trees < 10m	Closed Forest Low Closed Forest	Open Forest Low Open Forest	Woodland Low Woodland	Open Woodland Low Open Woodland
Shrub Mallee	Closed Shrub Mallee	Shrub Mallee	Open Shrub Mallee	Very Open Shrub Mallee
Shrubs > 2m Shrubs 1-2m Shrubs <1m	Closed Tall Scrub Closed Heath Closed Low Heath	Tall Open Scrub Open Heath Open Low Heath	Tall Shrubland Shrubland Low Shrubland	Tall Open Shrubland Open Shrubland Low Open Shrubland
Grasses	Closed Grassland	Grassland	Open Grassland	Very Open Grassland
Herbs	Closed Herbland	Herbland	Open Herbland	Very Open Herbland
Sedges	Closed Sedgeland	Sedgeland	Open Sedgeland	Very Open Sedgeland

(Western Australian Planning Commission, 2000)

2.5.2.3 Vegetation Condition

The site was traversed by vehicle and by foot to assess the vegetation condition. The Vegetation Condition scale was that of Keighery (1994) as used in Bush Forever, (Western Australian Planning Commission, 2000) (Table 2).

Table 2: Vegetation Condition Scale

Condition	Definition
P Pristine	No obvious signs of disturbance.
E Excellent	Vegetation structure intact, disturbance affecting individual species; weeds are non-aggressive species
V Very Good	Vegetation structure altered; obvious signs of disturbance
G Good	Vegetation structure significantly altered by very obvious signs of multiple disturbance; basic vegetation structure or ability to regenerate it is retained
D Degraded	Basic vegetation structure severely impacted by disturbance; scope for regeneration but not to a state approaching good (sic) condition without intensive management
C Completely Degraded	Vegetation structure not intact; the area completely or almost completely without native species ('parkland cleared').

(Western Australian Planning Commission, 2000)

2.5.2.4 Results

Botanists recorded 29 plant taxa across the site, with 11 (38%) of these taxa exotic (weed) species. The list of species recorded for Coondaree Swamp is presented in Table 3.

There were a number of taxa that could not be positively identified due to inadequate fruiting or flowering material available at the time of the survey. These taxa are labelled with a "?".

No Declared Rare Flora species, as listed under subsection (2) of Section 23F of the Western Australian *Wildlife Conservation Act 1950* were found at the site. No species governed by the *Environment Protection and Biodiversity Conservation Act 1999* were located within the study area.

One Priority Flora species as listed by the Department of Environment and Conservation (Atkins, 2006) was located within the study area. *Schoenus ?capillifolius* (P2) was found to be widespread throughout the survey area growing underneath the Closed Tall Scrub of *Melaleuca teretifolia*.

This species of *Schoenus* could not be positively identified at the time of the survey as it comes into flower and fruit in October/November of each year. A subsequent collection of fertile material will be undertaken to confirm the identification of this species.

No other flora species of other conservation significance as stated in Guidance Statement 51 (EPA, 2006) or as listed in Bush Forever (WAPC, 2000) were recorded at Coondaree Swamp.

Table 3: Species Recorded at Coondaree Swamp

Weed	Species	Form	Status
	<i>Acacia pulchella</i>	Shrub	
*	<i>Alternanthera angustifolia</i>	Herb	
	<i>Baumea articulata</i>	Rush	
*	<i>Briza maxima</i>	Grass	
	<i>Carex appressa</i>	Herb	
	<i>Casuarina obesa</i>	Tree	
*	<i>Crassula natans</i>	Herb	
*	<i>Dittrichia graveolens</i>	Herb	
*	<i>Eragrostis curvifolia</i>	Grass	
*	<i>Ehrharta longifolia</i>	Grass	
	<i>Eucalyptus camaldulensis</i>	Tree	
	<i>Eucalyptus camaldulensis/rudis</i>	Tree	

Weed	Species	Form	Status
	<i>Eucalyptus rudis</i>	Tree	
	<i>Glinus lotoides</i>	Herb	
	<i>Juncus subsecundus</i>	Sedge	
	<i>Lachnagrostis</i> sp.	Grass	
	<i>Lepidosperma longitudinale</i>	Sedge	
	<i>Marsilea drummondii</i>	Herb	
	<i>Meeboldina decipiens</i> subsp. <i>decipiens</i>	Sedge	
	<i>Melaleuca lateritia</i>	Shrub	
	<i>Melaleuca teretifolia</i>	Shrub	
*	<i>Mentha pulegium</i>	Herb	
*	? <i>Phalaris paradoxa</i>	Grass	
*	<i>Pinus</i> sp.	Tree	
	<i>Potamogeton drummondii</i>	Aquatic Herb	
	<i>Schoenus</i> ? <i>capillifolius</i>	Herb	?P2
*	<i>Sporobolus africanus</i>	Grass	
*	<i>Typha orientalis</i>	Rush	
	<i>Typha domingensis</i>	Rush	

Hedde et al. (1980) mapped vegetation in the area as Guildford Complex. This complex is dominated by a mixture of an open-forest to tall open forest of *Corymbia calophylla* – *E. wandoo* – *E. marginata* and woodland of *E. wandoo* (with rare occurrence of *E. lane-poolei*). There are minor components of fringing woodland of *E. rudis* – *Melaleuca raphiophylla* along the streams.

There were 6 vegetation units mapped across Coondaree Swamp from the survey (Figure 2):

1. Closed Tall Scrub of *Melaleuca teretifolia* with Open Shrubland of *Melaleuca lateritia* over *Schoenus* ?*capillifolius* and pasture weeds including **Briza maxima*, **Ehrharta longifolia*, **Mentha pulegium* and **Alternanthera angustifolius*.
2. Open woodland of *Eucalyptus rudis* and/or *Eucalyptus camaldulensis* with Tall Open Scrub to Tall Shrubland of *Melaleuca teretifolia* over *Schoenus* ?*capillifolius* and Poaceae spp. including **Eragrostis curvula* and *Lachnagrostis* sp.
3. Planted trees including **Pinus pinaster* and *Eucalyptus camaldulensis*.
4. Closed Sedgeland/Rushland of **Typha orientalis*, *Juncus subsecundus*, *Meeboldina decipiens* subsp. *decipiens* and *Lepidosperma longitudinale*.
5. Fringing Open Woodland of *Eucalyptus camaldulensis/rudis* and *Casuarina obesa* over Tall Shrubland of *Melaleuca teretifolia* over pasture weeds.

6. Cleared paddock of pasture with isolated trees of *Eucalyptus camaldulensis/rudis* and *Melaleuca teretifolia*.

The majority of the vegetation at Coondaree Swamp is in Good Condition. The regrowth of *Melaleuca teretifolia* has been vigorous, helping to keep out stock and prevent the introduction of weeds. The eastern side of the clay pits have remnant rushes and sedges in good condition, whilst the paddock to the west is completely degraded. The vegetation condition across Coondaree Swamp is shown in Figure 3.

2.6 Existing Habitat

The portion of Coondaree Swamp which has previously been excavated contains an open water component, surrounding reed beds and fringing vegetation. This created habitat provides some drought refuge, and some breeding and feeding function for avian and other fauna. This function will be maintained and improved post-mining.

However, the structure and dimensions of the current wetland provide little variety in habitat diversity, and steep sides limit the opportunities for wading birds. The three different zones of habitat within Coondaree Swamp include:

- Open Water Body
- Littoral Zone
- 'Dry' Land

2.7 Past and Current Land Uses

Coondaree Swamp is located within the Midland Brick excavation site and within the Western Australian Planning Commission's Priority Resource location for clay (BBG, 2001)

The western half of the existing wetland area has previously been mined, open pits from this activity are still present.

Available historical information indicates that there have been agricultural activities adjacent to and within the swamp area for over 25 years.

3.0 MINING ACTIVITIES AND DESIGN

3.1 General

Coondaree Swamp has been previously excavated in three separate pits (Pits 1, 2 and 3) (refer to Figure 1), which covers approximately half of the swamps original extent. To preserve the function of the pits as a drought refuge only one pit will be drained and excavated at any one time.

It is intended that mining in this general area will commence with a pit which will be developed outside the western boundary of Coondaree Swamp, within Lot 100. Once clay extraction has been completed in this pit, water within Pit 1 will be drained to this location (outside Coondaree Swamp boundary) to allow excavation to be undertaken in Pit 1 in the dry summer months. As the excavation will be undertaken in a cell-by-cell approach, excavated areas will be rehabilitation to retain the function of the area. Mining will continue in a south eastern direction across the site in 3 stages (refer to Figure 4).

It should be noted that the pits will be excavated above the current water table and therefore water flow into the pits (swamp) will be predominately from run-off from the large upland area within the Darling Scarp-Upper Swan South Catchment in the east and from direct rainfall into the swamp. Seasonal water variations within the swamp will occur within the lowest water levels, that being in March/April. The banks of the pits are designed to ensure that they will not be unsightly or unsafe during periods of lowest water levels.

3.2 Project Stages

3.2.1 Lot 100 (Western Section)

Excavation is proposed to commence in Lot 100 (west of Coondaree Swamp and outside the Rehabilitation Plan area) during the summer months of 2008. It is estimated that approximately 120,000m² of clay will be removed from a 3ha area, which will result in a 4m decrease in surface height from existing site topography. A lake with a surface area of 1ha may be created to hold water to facilitate efficient de-watering of Pits 1, 2 and 3 within Coondaree Swamp (Figure 1). Once excavation has been completed including reshaping batters, topsoiling and creating lake area, revegetation will commence in this area.

3.2.2 Stage 1

Excavation is proposed to commence during the summer months in the north-western end of the Coondaree Swamp area which will include re-mining the two un-rehabilitated pits (Pits 1 and 2) (Figure 4). Water from these pits will be drained to the completed excavation area in the western end of Lot 100 (as discussed in Section 3.2.1). Only one pit will be worked at a time. Rehabilitation will commence on the first pit (including re-contouring and revegetation) prior to excavation commencing on the second pit. Once excavation of both pits has been completed they will be joined to form one water body and rehabilitation continued.

Stage 1 is anticipated to take approximately 4 years to complete with works proposed to commence in 2013 (following completion of the extraction in the western end of Lot 100 as described in Section 3.1).

3.2.3 Stage 2

Once the Stage 1 works are complete, Pit 3 within Lot 19 will be drained into the Lot 100 reformed lake and/or the pits (4 and/or 5) to the south of Coondaree Swamp. Excavation will then commence on this pit and continue eastwards into Lot 7. Reshaping of the lake will be undertaken as the excavation progresses, with the western areas of the pit reshaped and revegetated. The Stage 2 works are anticipated to take approximately 6 years to complete with works proposed to commence in 2021.

3.2.4 Stage 3

Stage 3 of works including Pits 4 and 5 are located in the southern end of Lot 19 and the eastern side of Lot 7 (Figure 4). This area is outside of the Coondaree Swamp extent.

3.3 Post-mining Wetland Design

As initially presented in the RPS BBG (2004) Section 46 Review report, Coondaree Swamp is part of a larger proposed wetland corridor that will extend from Coondaree Swamp to the Swan River in the south (Figure 5).

The dimensions of the wetland post mining including shape, slope batters etc will be refined and finalised closer to the commencement of mining operations. As discussed in Section 2.6 there are only three habitats types currently within the wetland area. These types will be replicated and where possible improved upon once staged mining has been completed. Rehabilitation of these areas is discussed in Section 4.

Based on current catchment yields of Pits 1, 2 and 3, the maximum surface area of the post-mining wetland would be approximately 5.6ha and on average 3m deep. A conceptual rehabilitation plan for the entire Midland Brick site (Ministerial Statement 699 extent) is shown in Figure 5.

The surface water drain¹ which currently traverses Coondaree Swamp will be eventually diverted into the wetland once excavation at the site is completed and then the linked wetland chain will be established in stages as described in the Section 46 review (RPS, BBG, 2004).

In order for this to occur, Midland Brick will take on responsibility for the drainage reserve south of Copley Road. Midland Brick has a legal agreement with the City of Swan which addresses water management from this catchment. It should be noted that the surface water drain is predominately dry in the summer months.

¹ Vested in the City of Swan (Volume 2225, Folio number 256)

4.0 COONDAREE SWAMP REHABILITATION

4.1 Objectives

The primary objective rehabilitation² within the wetland is to improve the existing habitats and drought refuse function through the swamp area and to ensure the long-term stability of soils, landforms and hydrology required for the sustainability of the site.

Due to the level of past grazing activities and proposed (approved) disturbances the reinstatement of the original habitat is not possible, however, the following Sections provide information on how the condition of Coondaree Swamp will be improved from the current situation after mining operations.

4.2 Topsoil and Overburden

Prior to clay mining the top soil (approximately 20 cm) will be removed and stockpiled on site. Overburden will also be removed and stockpiled for future use in re-grading the site. The stockpiled top soil will be returned and used to develop modest batters with shallow sloping 'shoreline' edges of varying widths. Wherever possible, topsoil will be transferred directly to rehabilitation areas.

It may be possible to use direct topsoil transfer methods to minimise stockpiling once rehabilitation has commenced.

4.3 Wetland Size, Shape and 'Shoreline'

The location size and configuration of the wetland may vary depending on the amount of clay excavated and the suitability of the soils for wetland establishment. It will also be designed considering the catchment hydrology and the necessary volumes to maintain the specific habitat requirements i.e. some open water present during the summer months.

Increasing the size of the existing wetland including open water provides the opportunity to incorporate a greater range of habitat features compared to the existing habitat types. The irregular shaped wetland 'shoreline' will maximise the length and variety of the edge habitat, and will enhance the visual amenity of the wetland. The creation of wading areas of various depths (not currently provided for) may also prove attractive to bird species.

² For the purposes of this Rehabilitation Plan, Rehabilitation means to maximise the return of biodiversity by reinstating self-sustaining and functional ecosystems based on local species (EPA, 2006).

The depth of the wetland after excavation and the grade of the banks will prevent the development of breeding habitats for mosquitoes. A variety of slopes from the 'shoreline' will be constructed to increase habitat diversity and because of the cell-by-cell excavation process the opportunity exists to create an island which will improve visual and habitat variety. Overburden generated on site, (if absent of invasive weeds and contaminants), may be used for creating the islands. The island will also provide nesting refuges for local bird populations and provide security from feral animals.

4.4 Revegetation

The following Sections address works pre and post-ground disturbing activities within the Coondaree Swamp area.

4.4.1 Plant and Seed Collection

The following seed collection protocol has been adapted from the Florabank Guidelines.

Essential

1. Prior to collection all permits and permission to be obtained.
2. Native seed is only collected from plants that have been positively identified or where a voucher specimen (sample of leaves, buds, flowers or fruit and plant description) is collected.
3. Seed is collected from at least 10 widely spaced, healthy parent plants.
4. Seed is not collected from isolated plants unless this seed is combined with seed from other local plants to increase the genetic diversity of the mix.
5. No more than 20% of the fruit from any one plant is removed.
6. No more than 10% of plant material from any one plant is removed.

Desirable

7. Seed is collected only from plants separated from each other by a distance of at least twice the plant height in order to reduce the probability of sampling related plants (Natural Area Management and Services, 2007).

Seed will be taken from three native plant species on site prior to mining within each stage, these species are identified in Table 4.

Table 4: Recommended Species Seed Collection and timeframe

Species	Collection Time
<i>Casuarina Obesa</i>	Late Summer
<i>Eucalyptus rudis</i>	Early new year
<i>Melaleuca laterita/teretifolia</i>	Anytime

Source : Natural Area Management and Services, 2007

Other remnant native species on site would be propagated by salvage/division from October to December.

4.4.2 Plantings

4.4.2.1 Species

Rehabilitation plantings will only include species that are endemic to Perth Coastal Plains wetlands and/or either currently present in the local area or had a high likelihood of original presence. Permanent and deep water which would not likely have existed in Coondaree Swamp pre disturbance, suggests that to provide appropriate habitat for the ecology of the deeper water body, a broader suite of species, relevant to the altered landform is appropriate. These species include, eg. *Schoenoplectus validus* (Lake Club Rush), *Baumea juncea* (Bare Twig Rush), *Baumea preissii*, *Bolboschoenus caldwellii* and *Eleocharis acuta* (Natural Area Management and Services, 2007).

Planting of vegetation around the edge of the lake will act as a buffer to the lake, reduce the potential for erosion and will assist with nutrient uptake, preventing accumulation in the wetlands and/or lakes. Aquatic vegetation will also be used to create a benthic community. Sedges such as *Baumea articulata* will be established given their affinity to clay soils and drought resistance and submergent species will also be introduced for habitat establishment within the lakes.

Currently, there is little diversity of plant species within the wetland area, with several weed species dominant. Table 5 provides a list of native species which have been identified in the surrounding areas, and are suggested for revegetation given their suitability for the soil type and hydrological regime. A selection of these species from the different plant categories i.e. tree/shrub, sedge and herb will assist in the biodiversity of the area and in improving the habitats available.

Table 5: Suggested Species for Revegetation

Species Name	Common Name	Pot Size
Tree		
<i>Astartia fascicularis</i>		Tube
<i>Banksia ilicifolia</i>	Holly-leaved Banksia	Olive ³
<i>Banksia littoralis</i>	Swamp Banksia	Tube
<i>Casuarina obesa</i>	Swamp Sheoak	Olive and 10 Ltr
<i>Corymbia calophylla</i>	Marri	Tube and 10 Ltr
<i>Eucalyptus rudis</i>	Flooded Gum	Tube and 10 Ltr
Sedge		
<i>Baumea articulate</i>	Jointed Rush	10 tlr
<i>Baumea juncea</i>	Bare Twigrush	Olive/sedge Strip
<i>Baumea preissii</i>	-	70mm
<i>Baumea rubiginosa</i>	-	Olive/sedge Strip
<i>Bolboschoenus caldwellii</i>	Marsh Club-rush	Olive/sedge Strip
<i>Carex appressa</i>	Tall Sedge	Olive
<i>Carex tereticaulis</i>	-	Olive
<i>Eleocharis acuta</i>	Common Spoke-rush	Olive
<i>Kunzea ericifolia</i>	Spearwood	Tube and Olive
<i>Kunzea recurve</i>	-	Tube and Olive
<i>Lepidosperma longitudinale</i>	Pithy Sword-Sedge	Tube and Olive
<i>Regelia ciliata</i>	-	Tubes
<i>Regelia inops</i>	-	Tubes
<i>Schoenoplectus validus</i>	Lakes Club-rush	Olives and 10Ltr
<i>Viminaria juncea</i>	Swishbrush	70mm
Herb		
<i>Centella asiatica</i>		70mm
<i>Glinus lotoides</i>	Hairy Carpet Weed	70mm and strip
<i>Juncus kraussii</i>	Sea rush	Olive and Sedge Strip
<i>Juncus pallidus</i>	Pale Rush	Tube and Olive
<i>Juncus subsecundus</i>	Finger Rush	Olive an Sedge Strip
<i>Lobelia alata</i>	Angled Lobelia	70mm
<i>Typha domingensis</i>	Bulrush	Olive and 10Ltr

Source: (Natural Area Management and Services, 2007)

³ 90x90x200 deep.

4.4.2.2 Planting Ratios

Seeding and planting of tube stock will be undertaken during autumn prior to winter rains. Proposed planting densities (per m²) for the site, include the following:

- Tree species 1 tree/10 m²
- Shurb species 1 shurb/5 m²
- Rushes/sedges 2/ m²
- Herbs 2/ m²
- Native seeds 3.5 to 4kg/ha

These plantings densities allow for anticipated mortality with planting proposed at a higher density than final rehabilitation targets. Rehabilitation survival is further discussed in Section 5.2.

If during the monitoring periods (refer to Section 5) predation of rush / sedge is an issue then advanced plant sizes will be used. Advanced sedges would be planted at a density of 1 every 1m² or if sedge strips are used then 1 strip to each 4 or 5 m² would be used. If predation can be avoided, establishment of plants in the damp areas should be strong with rapid cover achieved. The densities in the dryer areas may need to be higher to counter the likely higher failure rate. Upper storey plants will be established first to provide protection of understorey species when planted (Natural Area Management and Services, 2007).

4.4.2.3 Planting stages

The following planting stages will be undertaken for three years after mining has been completed:

- First year: plant upper storey species and weed control
- Second year: plant shrubs and weed control
- Third year: understorey plantings with weed control

4.4.3 **Environmental Weeds**

Close monitoring and control of environmental weeds will be undertaken as invasive species can take the opportunity to proliferate post disturbance if not controlled. The rate of revegetation will not exceed the rate of weed control. Elimination of *Typha orientalis* will be undertaken as it has the potential to dominate and add considerably to the fire fuel load. Two to three seasons of weed control will be undertaken for each rehabilitation site (Natural Area Management and Services, 2007).

Regular monitoring will be undertaken to detect weed invasion. Weed surveys to assess the presence of weed species will be undertaken annually for four years in spring by a qualified botanist. Following review of the survey results necessary weed removal with guidance from the botanist.

Weeds will be controlled using methods described in Water Note “Herbicide Use in Wetlands” (WRC, 2001). Methods will include physical removal (including hand weeding and slashing prior to seeding) or using a herbicide applied by hand spray or wand. In order to minimise the risks associated with herbicide use near wetland areas the following will be undertaken:

- Herbicides will be applied at the recommended rate.
- Apply spray at the correct time of year (when growth is strong and seeds have not set).
- Provide follow up weed treatment to minimise repeat herbicide application requirements.
- Application to be avoided at times when plants are under stress (such as very hot days and dry to dusty condition) to assist with maximum herbicide uptake.
- Avoid spray application on windy days or when rain is likely.
- Avoid the use of surfactants.

4.5 Constructing Fauna Habitat

To increase the diversity of fauna habitat, the following will be incorporated where appropriate:

- Conservation and reuse of vegetation by chipping or respreading as much as possible, use of existing branches to provide shelter for small invertebrates and reptiles. This will also aid in erosion protection particularly within the littoral zone.
- The construction of nest boxes and roosting posts to provide shelter and breeding habitat.
- Use of old dead trees (previously on site) to provide hollows, crevices and shelter (DoTARS, 2006).

The following additional features will also assist to provide fauna habitat diversity:

- Open water present during the summer months.
- Littoral zone ranging in different slopes.
- ‘Dry’ areas.

Currently there is little to no active environmental management within the Coondaree Swamp area. The progressive rehabilitation of the wetland will be managed for 4 years following completion of excavation in each stage unless an agreement is reached with the DEC.

5.0 IMPLEMENTATION AND CONTINGENCY MEASURES

5.1 Monitoring

Rehabilitation areas will be monitored to allow early detection of locations requiring additional attention. Four quadrats will be established within the rehabilitation area which will be monitored by a qualified botanist twice yearly during spring and autumn. Monitoring will include assessment of:

- Species present;
- Percentage vegetation cover of native species and weeds; and
- Planted vegetation survival rates.

Quadrat sizes will be 10m x 10m plots for floristic (Species presence/absence and weed presence) and 2m by 2m plots (four in the corner of each 10m² plot) for species presence and cover percentage. Monitoring results will be included in the Performance and Compliance Reports (PCR) for assessment by the DEC.

General inspections of the rehabilitation area will also be made at the same time as quadrat sampling is undertaken to search for signs of vegetation and landform disturbance and vegetation deaths. Should any of these occurrences be detected additional rehabilitation worked would be undertaken in these areas to rectify the situation (see Section 5.2). Observations and remedial actions will be reported in the PCR.

Monitoring within Stage 1 to 3 of the excavation north of Copley Road (Figure 3) is proposed to continue for four years following completion of excavation within each stage unless an agreement is reached with the DEC that monitoring is no longer required given the stable nature of the revegetation program.

5.2 Performance Criteria

5.2.1 Revegetation

The success of the re-establishment of vegetation planted as part of the rehabilitation of the area can be measured in several ways. Two criteria proposed to measure the vegetation success within Coondaree Swamp are presented in Table 6.

Table 6: Vegetation re-establishment Success Criteria

	Year		
	One	Two	Three
% of total planted number surviving at yearly intervals within pre-established quadrats	75%	60%	50%
% of all plants within quadrat producing propagules and/or recouplement from end.	-	40%	60%

Source: (Natural Area Management and Services, 2007)

5.2.2 Weed Control

General standard of weed control is proposed for Coondaree Swamp which involves the control of the top 2 /4 graded weeds and minor presentations of higher grade weeds with potential for proliferation and rapid advancement in the hierarchy. Also that control occurs over two years.

Assuming pre-mining weed coverage is 100 % of the revegetation area , achievement of weed standard grading would be considered achieved if the following percentages of weed cover are recorded at the commencement of the next weed season and before commencement of new seasons control (Natural Area Management and Services, 2007).

Table 7: Weed Percentages over Monitoring Period

	Year			
	One	Two	Three	Four
Standard Weed Control	80%	60%	50%	60%

Source: (Natural Area Management and Services, 2007)

5.3 Contingency Measures

5.3.1 Revegetation

If during the monitoring period there are areas of significant erosion on the wetland 'shoreline' or plant deaths exceed the percentages identified in Table 6 the following management measures will be enacted as required:

- Assessment of the likely cause of the erosion, modification of the landform (if required) to prevent a repeat occurrence and re-establishment of the eroded area and fix the current erosion damage.
- Assessment of the likely reasons for plant deaths and identification of any changes required to revegetation management. If changes are required the DEC will be informed of the refined strategy.

- Should survival rates drop below percentages in Table 6 for that year, stock will be replanted the following winter.

5.3.2 Weed Management

Excessive weed growth, greater than the percentages in Table 7 will also trigger the need for a contingency response. The contingency response for excessive weed growth will include the application of further herbicide or additional hand removal. If reapplication is not successful, alternative treatments will be considered, including the commissioning of a weed removal expert.

5.4 Implementation Schedule

As the owner and operator of the site (including Coondaree Swamp) Midland Brick will undertake, manage and fund the rehabilitation program until the completion criteria outlined below in Table 8 are met. Table 8 presents a provisional schedule of all programmed monitoring activities.

Table 8: Monitoring Schedule

Issue	Parameter	Frequency	Timeframe	Responsibility
Seed Collection	Collect seeds in accordance with Table 1	Once	Prior to site clearing	Midland Brick
Site Works	Provide DEC with engineering drawing of proposed post mining site characteristics i.e. elevations, wetland boundary configurations, depths etc	Once for each pit	Prior to remaining each individual pit (1 to 3)	Midland Brick
	Remove and stockpile topsoil and overburden	As required	Prior to mining	Midland Brick
Rehabilitation	Plant upper storey species and weed control	-	First year after mining completion	Midland Brick
	Plant shrubs and weed control	-	Second year after mining completion	Midland Brick
	Understorey plantings with weed control	-	Third Year after mining completion	Midland Brick
	Establish 4 quadrats (5m x5m) plots	Once	When staged mining has been completed	Midland Brick
	Survey quadrats	Annually (Spring)	4 years	Midland Brick
	Assess the success of the re-establishment of vegetation planted	Annually	4 years	Midland Brick
	Assess percentage weed cover	Annually	4 years	Midland Brick
No evidence of erosion occurring around wetland periphery	-	-	Completion of rehab program	Midland Brick

Issue	Parameter	Frequency	Timeframe	Responsibility
Reporting	Coondaree Swamp Rehabilitation Plan available to public on request.	-	Duration of Rehabilitation Plan	Midland Brick
	Report in the PCR on revegetation success as outlined in Section 5.1.	Two yearly, unless problems are detected	Four Years	Midland Brick

6.0 ADDRESSING MINISTERIAL STATEMENT CONDITIONS

The Audit Table (below) identifies the Sections of this Wetland Rehabilitation Plan which addresses Ministerial Statement No. 699 Condition 7.

Table 9: Sections of Rehabilitation Plan addressing Ministerial Condition 7

Audit Code	What Action Must be Undertaken	Project Phase	Section
7.1.1	A report of a detailed vegetation and flora survey of the areas likely to be impacted by the proposal.	Prior to site works	Section 2.5
7.1.2	Characterisation of the habitats likely to be impacted by the proposal	Prior to site works	Section 2.6
7.1.3	An integrated and progressive mining and landscaping plan designed to optimise rehabilitation outcomes and provide a range of habitats in the final landform.	-	Section 3.3
7.1.4	Proposed final landforms and the identification of areas to be revegetated	-	Section 3.3
7.1.5	A rehabilitation and revegetation plan for areas of vegetation to be disturbed during excavation.	-	Section 4.0
7.1.6	Agreed timelines and progressive performance criteria.		Section 5.4
7.1.7	Monitoring against the agreed progressive performance criteria.	During and post excavation	Section 5.2
7.1.8	Contingency measures in the event that the rehabilitation or revegetation fails to meet agreed performance criteria.	-	Section 5.3
7.1.9	Responsibilities for continued maintenance of rehabilitation or revegetated and landscaped areas.	-	Section 5.4
7.2	The proponent shall implement the Wetland Rehabilitation Plan required by Condition 7.1	-	Section 5.4
7.3	The proponent shall make the Wetland Rehabilitation Plan required by Condition 7.1 publicly available.	-	Section 5.4

7.0 REFERENCES

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FIGURES

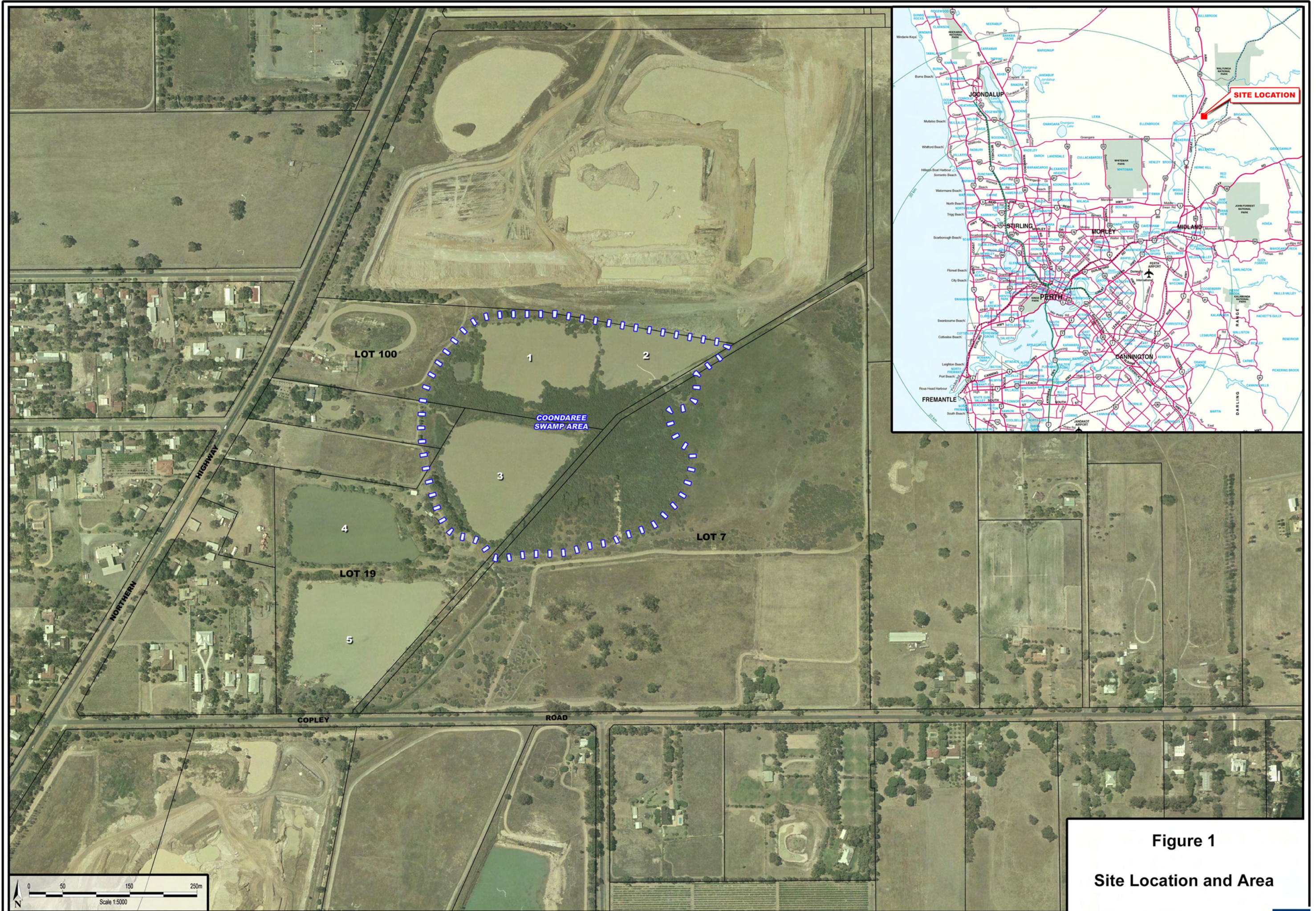
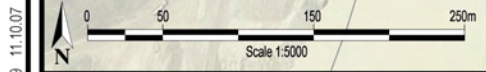


Figure 1
Site Location and Area



VEGETATION UNITS

- 1 Closed Tall Scrub of *Melaleuca teretifolia* with Open Shrubland of *Melaleuca lateritia* over *Schoenus ?capillifolius* and pasture weeds including *Briza maxima*, *Ehrharta longifolia*, *Mentha pulegium* and *Alternanthera angustifolius*.
- 2 Open woodland of *Eucalyptus rudis* and/or *Eucalyptus camaldulensis* with Tall Open Scrub to Tall Shrubland of *Melaleuca teretifolia* over *Schoenus ?capillifolius* and *Poaceae* spp. including *Eragrostis curvula* and *Lachnagrostis* sp.
- 3 Planted Trees including *Pinus pinaster* and *Eucalyptus camaldulensis*.
- 4 Closed Sedgeland/Rushland of *Typha orientalis*, *Juncus subsecundus*, *Meeboldina decipiens* subsp. *decipiens* and *Lepidosperma longitudinale*.
- 5 Fringing Open Woodland of *Eucalyptus camaldulensis/rudis* and *Casuarina obesa* over Tall Shrubland of *Melaleuca teretifolia* over pasture weeds.
- 6 Cleared Paddock of pasture with isolated trees of *Eucalyptus camaldulensis/rudis* and *Melaleuca teretifolia*.



Figure 2
Vegetation Units

0 25 75 125m
Scale 1:2000

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VEGETATION CONDITION

- Very Good
- Good
- Good to Degraded
- Degraded
- Completely Degraded

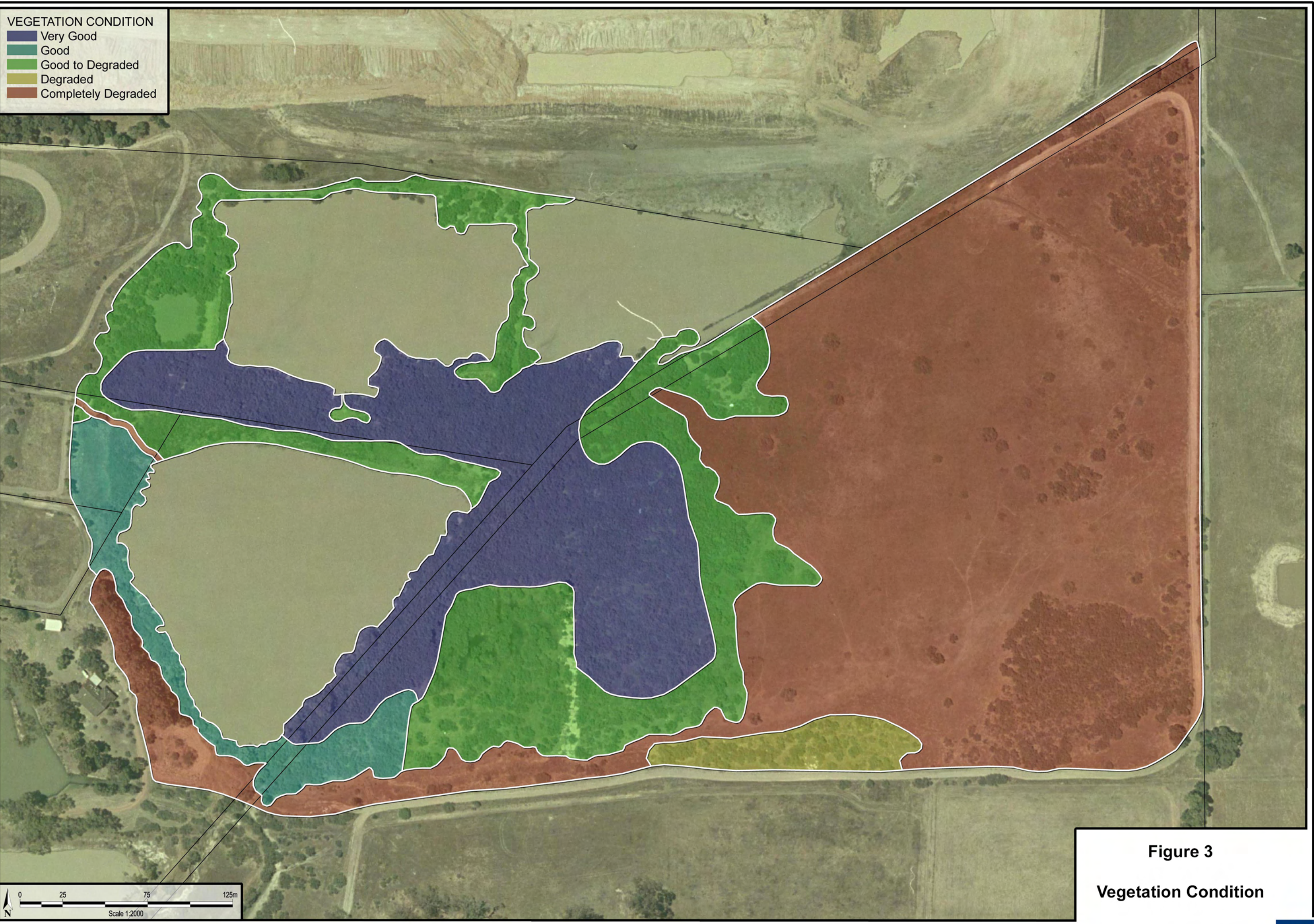
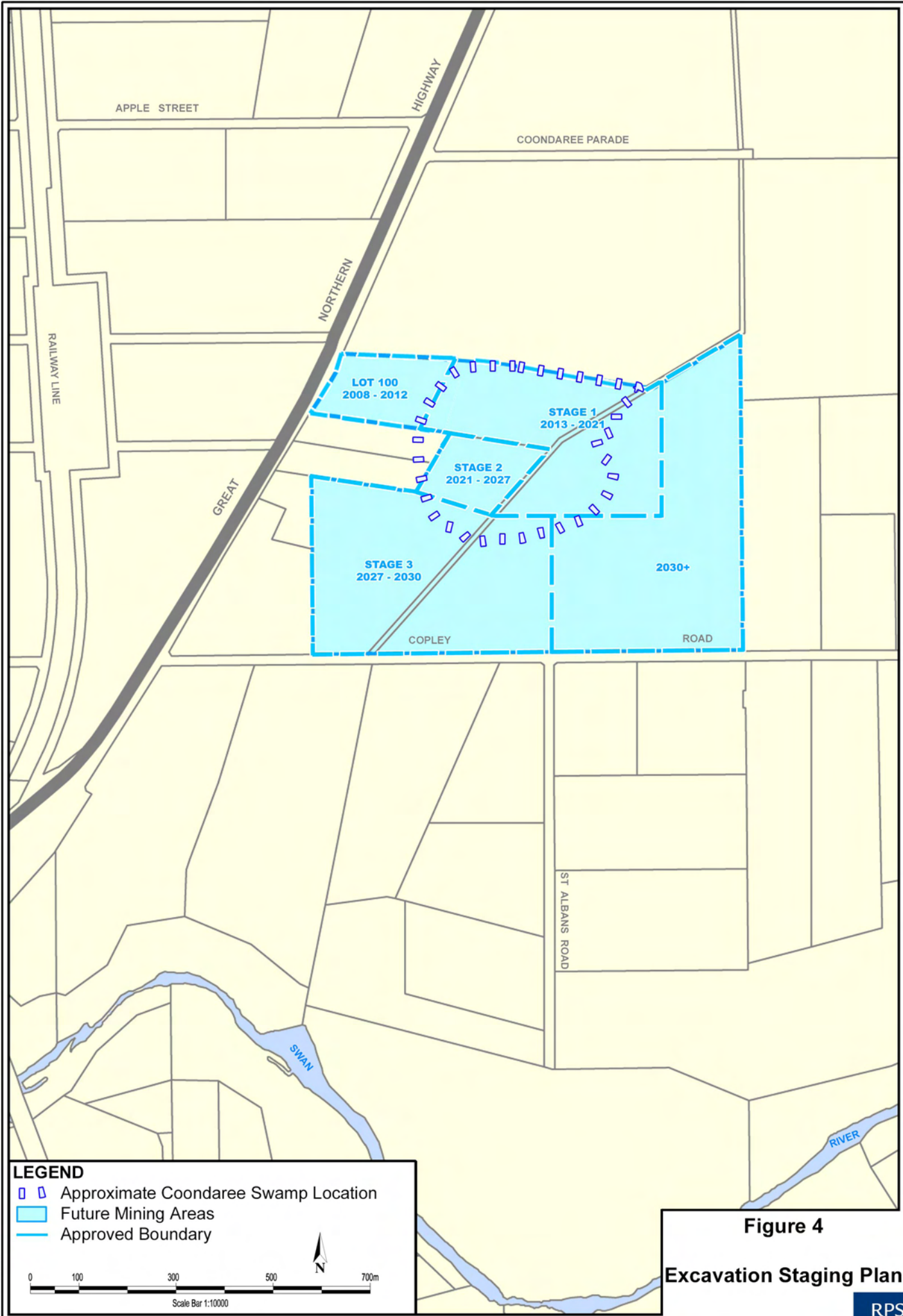


Figure 3
Vegetation Condition

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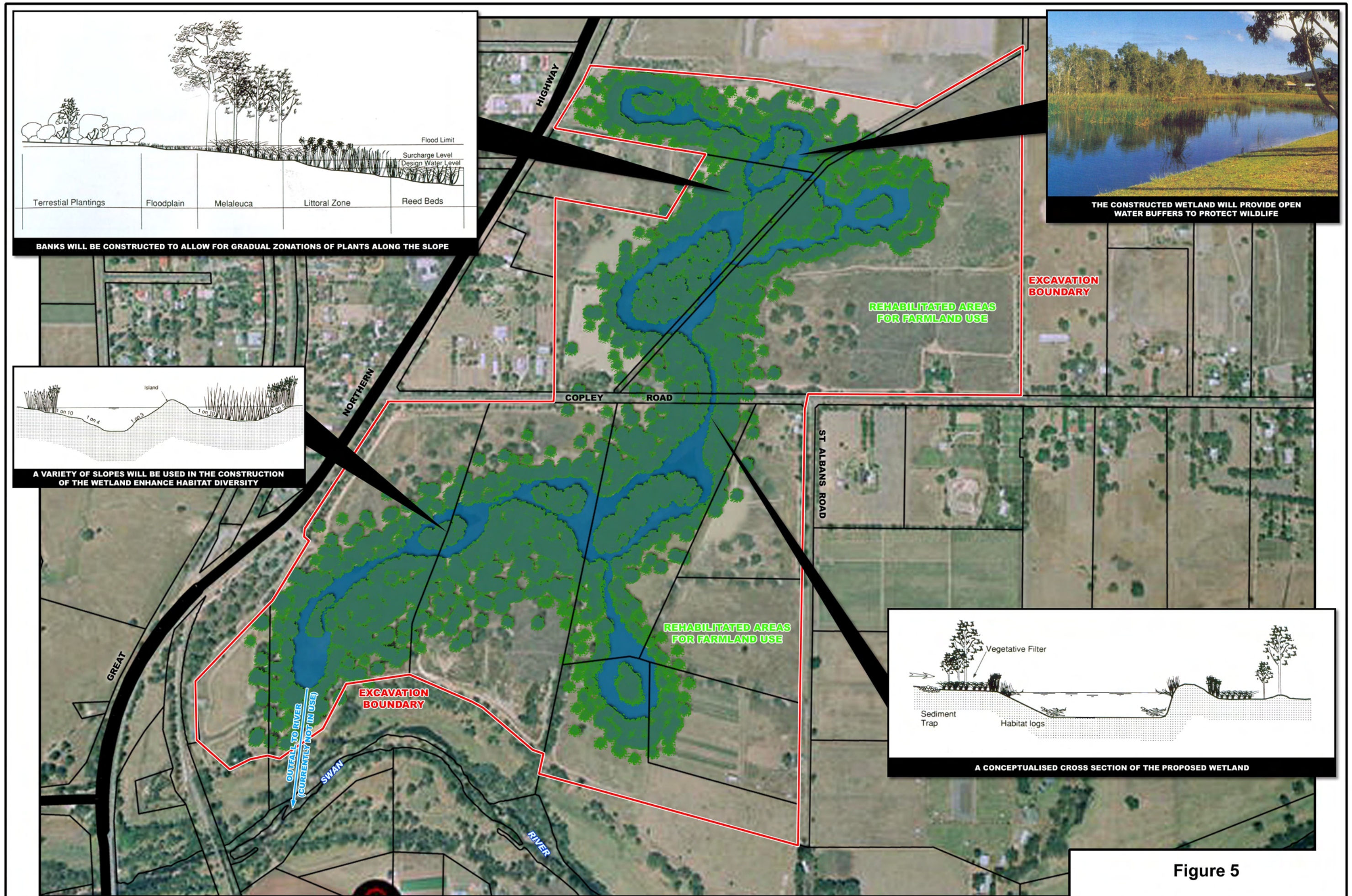








Figure 5
Conceptual Rehabilitation Plan



Source: The Constructed Wetlands Manual Vol. 2, Department of Land and Water Conservation NSW, 1998.

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LEGEND

-  Wetland Boundary (transition to dryland)
-  Rush / Sedge (node) Plantings
-  Bird Nesting Roostings
-  Tree Planting
-  10 - 20m Transitional Buffer from Open Water Edge - Shrubs to Trees
-  Open Water

HABITATS

- Island
- Open Water
- Littoral Zone
- Floodplain
- Dryland

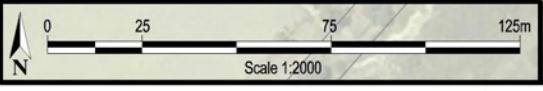
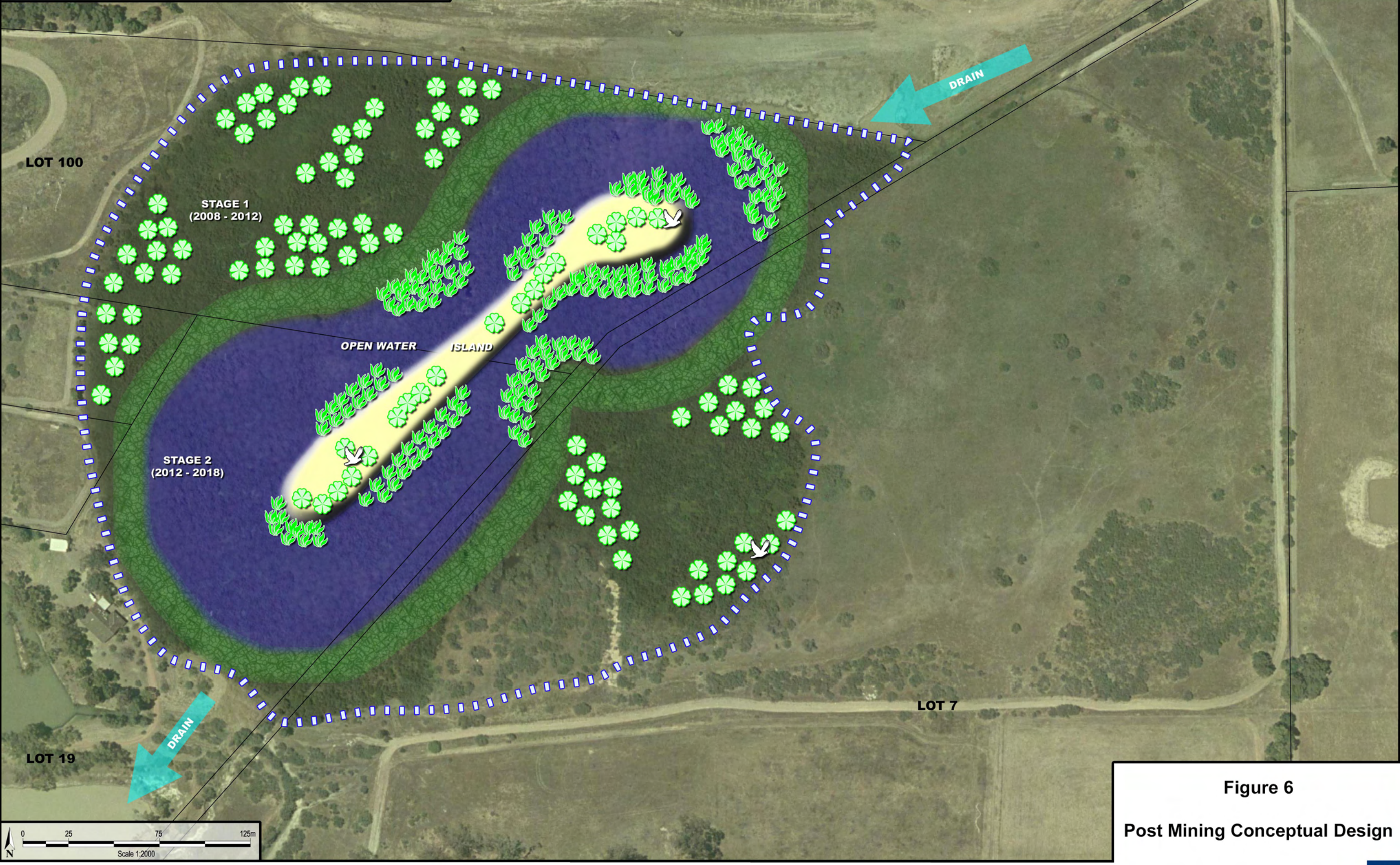
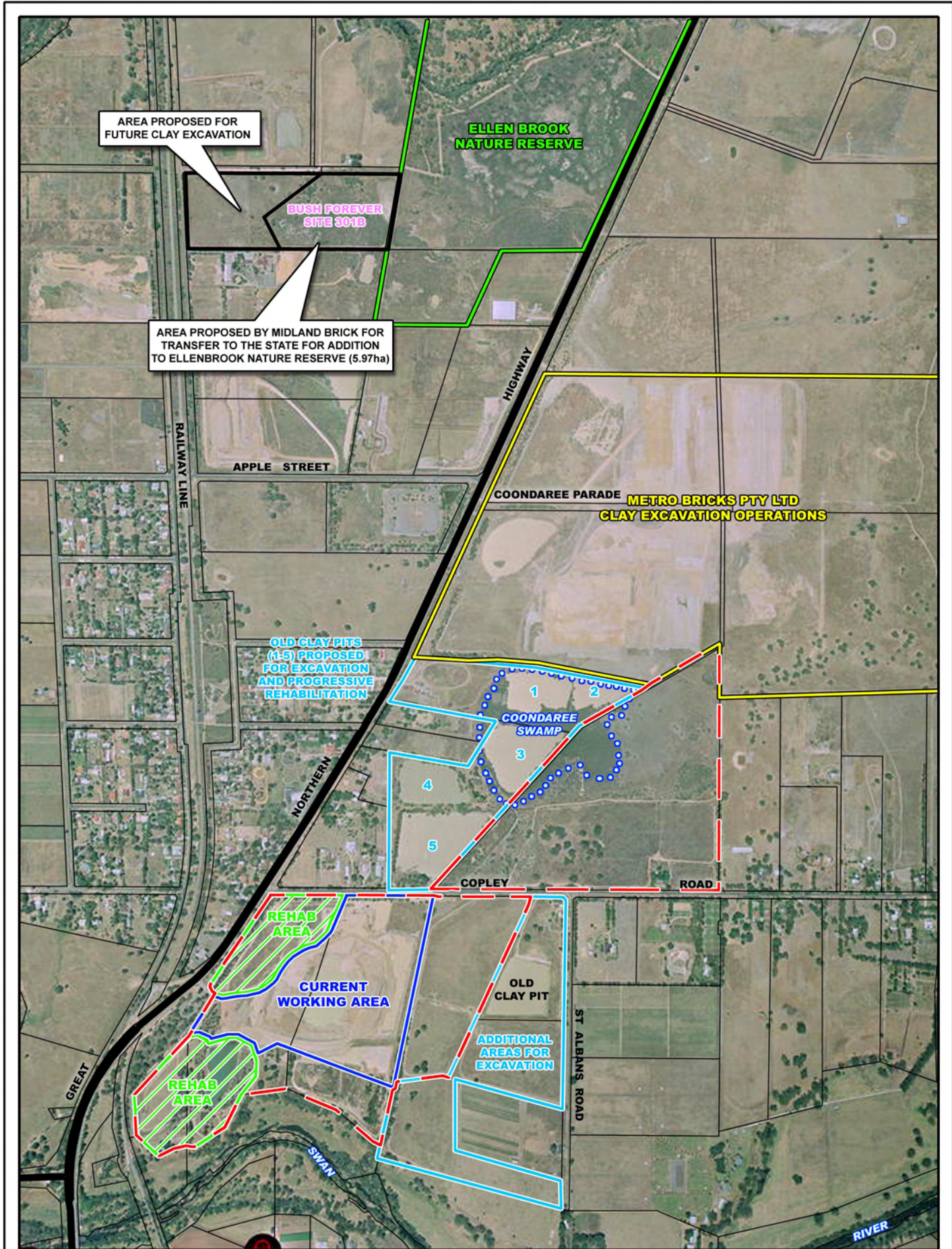


Figure 6
Post Mining Conceptual Design

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APPENDIX I

Coondaree Swamp Boundary as Shown in Section 46 Review



AREA PROPOSED FOR FUTURE CLAY EXCAVATION

AREA PROPOSED BY MIDLAND BRICK FOR TRANSFER TO THE STATE FOR ADDITION TO ELLENBROOK NATURE RESERVE (5.97ha)

ELLEN BROOK NATURE RESERVE

BUSH FOREVER SITE 301B

APPLE STREET

HIGHWAY

RAILWAY LINE

COONDAREE PARADE METRO BRICKS PTY LTD CLAY EXCAVATION OPERATIONS

OLD CLAY PITS (1-5) PROPOSED FOR EXCAVATION AND PROGRESSIVE REHABILITATION

COONDAREE SWAMP

NORTHERN

COPLEY

ROAD

REHAB AREA

CURRENT WORKING AREA

OLD CLAY PIT

ADDITIONAL AREAS FOR EXCAVATION

ST ALBANS ROAD

REHAB AREA

REHAB AREA

SWAN

RIVER

LEGEND

- Approved Boundary
- Additional Excavation Areas

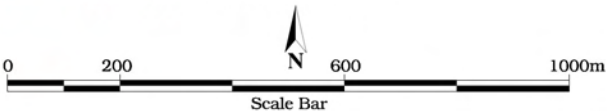


Figure 2

Aerial View of Site

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APPENDIX 2

Ministerial Statement 699



000699

STATEMENT TO AMEND CONDITIONS APPLYING TO A PROPOSAL
(PURSUANT TO THE PROVISIONS OF SECTION 46 OF THE
ENVIRONMENTAL PROTECTION ACT 1986)

CLAY EXCAVATION
LOTS 7, 19, 60, 63, 64 & 20 HALLETT & COPLEY ROADS
(formerly Part Lot 1 & Lots 222, 27, 26, 25, 28 & 7 Hallett & Copley Roads)
& LOTS 19, 45 & 46 ST ALBAN'S ROAD & LOT 100 GREAT NORTHERN HIGHWAY
UPPER SWAN

Proposal: The operation of a clay excavation facility in Upper Swan, as documented in schedule 1 of this statement.

Proponent: Midland Brick Company Pty Ltd

Proponent Address: 102 Great Northern Highway, MIDDLE SWAN WA 6056

Assessment Number: 1432

Previous Assessment Number: 504

Previous Statement Number: 251 (Published on 23 April 1992)

Report of the Environmental Protection Authority: Bulletin 1157

Previous Report of the Environmental Protection Authority: Bulletin 599

The implementation of the proposal to which the above reports of the Environmental Protection Authority relate is subject to the following conditions and procedures, which replace all previous conditions and procedures:

1 Implementation

1-1 The proponent shall implement the proposal as documented in schedule 1 of this statement subject to the conditions and procedures of this statement.

Published on
22 NOV 2005

2 Proponent Commitments

- 2-1 The proponent shall implement the environmental management commitments documented in schedule 2 of this statement.

3 Proponent Nomination and Contact Details

- 3-1 The proponent for the time being nominated by the Minister for the Environment under section 38(6) or (7) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal until such time as the Minister for the Environment has exercised the Minister's power under section 38(7) of the Act to revoke the nomination of that proponent and nominate another person as the proponent for the proposal.
- 3-2 If the proponent wishes to relinquish the nomination, the proponent shall apply for the transfer of proponent and provide a letter with a copy of this statement endorsed by the proposed replacement proponent that the proposal will be carried out in accordance with this statement. Contact details and appropriate documentation on the capability of the proposed replacement proponent to carry out the proposal shall also be provided.
- 3-3 The nominated proponent shall notify the Department of Environment of any change of contact name and address within 60 days of such change.

4 Commencement and Time Limit of Approval

- 4-1 The proponent shall substantially commence the modified proposal within five years of the date of this statement or the approval granted in this statement shall lapse and be void.

Note: The Minister for the Environment will determine any dispute as to whether the modified proposal has been substantially commenced.

- 4-2 The proponent shall make application for any extension of approval for the substantial commencement of the modified proposal beyond five years from the date of this statement to the Minister for the Environment, prior to the expiration of the five-year period referred to in condition 4-1.

The application shall demonstrate that:

- 1 the environmental factors of the proposal have not changed significantly;
- 2 new, significant, environmental issues have not arisen; and
- 3 all relevant government authorities have been consulted.

Note: The Minister for the Environment may consider the grant of an extension of the time limit of approval not exceeding five years for the substantial commencement of the modified proposal.

5 Compliance Audit and Performance Review

- 5-1 The proponent shall prepare an audit program and submit compliance reports to the Department of Environment which address:
- 1 the status of implementation of the proposal as defined in schedule 1 of this statement;
 - 2 evidence of compliance with the conditions and commitments; and
 - 3 the performance of the environmental management plans and programs.

Note: Under sections 48(1) and 47(2) of the *Environmental Protection Act 1986*, the Chief Executive Officer of the Department of Environment is empowered to monitor the compliance of the proponent with the statement and should directly receive the compliance documentation, including environmental management plans, related to the conditions, procedures and commitments contained in this statement.

- 5-2 The proponent may excavate clay indefinitely, subject to the acceptability of performance review reports which shall be submitted by 31 December 2006 and every five years thereafter, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The performance review reports shall address the following:

- 1 the major environmental issues associated with the project; the targets for those issues; the methodologies used to achieve these; and the key indicators of environmental performance measured against those targets;
- 2 the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable;
- 3 significant improvements gained in environmental management, including the use of external peer reviews;
- 4 stakeholder and community consultation about environmental performance and the outcomes of that consultation, including a report of any on-going concerns being expressed; and
- 5 the proposed environmental targets over the next five years, including improvements in technology and management processes.

6 Acid Sulfate Soils Investigation and Management Plan

- 6-1 Prior to any ground-disturbing activities associated with the excavation and dewatering of areas classed as having a "high risk" of Acid Sulfate Soils according to the Western Australian Planning Commission Bulletin No. 64 (2003), the proponent shall prepare an Acid Sulfate Soils Investigation and Management Plan to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The objectives of the Plan are:

- to ensure that any ground-disturbing activities which may disturb acid sulfate soils and/or contaminated waters are planned and managed to avoid adverse effects on the natural and built environment, human activities and health.

The Plan shall address:

- 1 identification of acid sulfate soils in and near areas proposed to be disturbed,

and, in the event that the disturbance of acid sulfate soils is unavoidable, the Plan shall also address:

- 2 potential on-site and off-site effects of the disturbance of the acid sulfate soils and/or groundwater levels;
 - 3 how drainage or soil extraction will be undertaken to minimise environmental impacts;
 - 4 how any acid leachate generated as a result of ground-disturbing activities will be managed;
 - 5 management of areas, both on and off-site, used to store or treat extracted soil;
 - 6 comprehensive surface and ground water quality monitoring both on and off-site, if applicable;
 - 7 establishment of agreed performance criteria and objectives in relation to environmental and social impacts; and
 - 8 contingency measures and procedures in the event that the agreed performance criteria may not be met.
- 6-2 The proponent shall implement the Acid Sulfate Soils Investigation and Management Plan required by condition 6-1.
- 6-3 The proponent shall make the Acid Sulfate Soils Investigation and Management Plan required by condition 6-1 publicly available.

7 Wetland Rehabilitation

7-1 Prior to the re-commencement of ground-disturbing activities, the proponent shall prepare a Wetland Rehabilitation Plan, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

This Plan shall include:

- 1 a report of a detailed vegetation and flora survey of the areas likely to be impacted by the proposal;
- 2 characterisation of the habitats likely to be impacted by the proposal;
- 3 an integrated and progressive mining and landscaping plan designed to optimise rehabilitation outcomes and provide a range of habitats in the final landform;
- 4 proposed final landforms and the identification of areas to be revegetated;
- 5 a rehabilitation and revegetation management plan for areas of vegetation to be disturbed during excavation;
- 6 agreed timelines and progressive performance criteria;
- 7 monitoring against the agreed progressive performance criteria;
- 8 contingency measures in the event that the rehabilitation or revegetation fails to meet agreed performance criteria; and
- 9 responsibilities for continued maintenance of rehabilitated and landscaped areas.

Note: In the preparation of advice to the Minister for the Environment, the Environmental Protection Authority expects to obtain advice of the Department of Environment and the Swan River Trust.

7-2 The proponent shall implement the Wetland Rehabilitation Plan required by condition 7-1.

7-3 The proponent shall make the Wetland Rehabilitation Plan required by condition 7-1 publicly available.

8 Environmental Management Programme

8-1 Within six months following the issuing of the notice to the decision-making authorities under section 45(7) of the *Environmental Protection Act 1986*, the proponent shall prepare an updated Environmental Management Programme, also addressing the requirements of conditions 6 and 7 and the new locations (see table 1), to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The plans, strategies or reports to be prepared as part of the Environmental Management Programme shall include the following:

- 1 a staged excavation strategy;
 - 2 Acid Sulfate Soils Investigation and Management Plan (see condition 6);
 - 3 groundwater management and protection;
 - 4 progressive rehabilitation of the site;
 - 5 Wetland Rehabilitation Plan (see condition 7);
 - 6 weed management;
 - 7 identification, management and protection of archaeological material, with the involvement of the Department of Indigenous Affairs;
 - 8 periodic reporting of monitoring results, incorporating monitoring of excavation and sieved clay for archaeological materials;
 - 9 procedures to minimise noise, dust and visual impacts associated with the quarrying and transport operations;
 - 10 public safety and mosquito control, with the involvement of the Department of Health at the design stage of water bodies and wetlands;
 - 11 consequential changes to project management to remedy unacceptable impacts; and
 - 12 clearly indicated timeframes for implementation of each stage.
- 8-2 The proponent shall implement the updated Environmental Management Programme required by condition 8-1.
- 8-3 The proponent shall make the updated Environmental Management Programme required by condition 8-1 publicly available.
- 8-4 The proponent shall periodically review the updated Environmental Management Programme required by condition 8-1.
- 9 Decommissioning**
- 9-1 Within two years following the date of this statement, the proponent shall prepare a Preliminary Decommissioning Plan including the additional areas for clay extraction, which provides the framework to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Nov 07

The Preliminary Decommissioning Plan shall address:

- 1 rationale for the siting and design of plant and infrastructure as relevant to environmental protection, and conceptual plans for the removal or, if appropriate, retention of plant and infrastructure;
 - 2 long-term management of ground and surface water systems;
 - 3 a conceptual rehabilitation plan for all disturbed areas and a description of a process to agree on the end land use(s) with all stakeholders;
 - 4 a conceptual plan for a care and maintenance phase; and
 - 5 management of noxious materials to avoid the creation of contaminated areas.
- 9-2 At least 12 months prior to the anticipated date of decommissioning, or at a time agreed with the Environmental Protection Authority, the proponent shall prepare a Final Decommissioning Plan designed to ensure that the site is left in an environmentally acceptable condition to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The Final Decommissioning Plan shall address:

- 1 removal or, if appropriate, retention of plant and infrastructure in consultation with relevant stakeholders;
 - 2 long-term management of ground and surface water systems;
 - 3 rehabilitation of all disturbed areas to a standard suitable for the agreed new land use(s); and
 - 4 identification of contaminated areas, including provision of evidence of notification and proposed management measures to relevant statutory authorities.
- 9-3 The proponent shall implement the Final Decommissioning Plan required by condition 9-2 until such time as the Minister for the Environment determines, on advice of the Environmental Protection Authority, that the proponent's decommissioning responsibilities have been fulfilled.
- 9-4 The proponent shall make publicly available the Final Decommissioning Plan required by condition 9-2.

Procedures

- 1 Where a condition states "to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority", the Environmental Protection Authority will provide that advice to the Department of Environment for the preparation of written notice to the proponent.

- 2 The Environmental Protection Authority may seek advice from other agencies or organisations, as required, in order to provide its advice to the Department of Environment.
- 3 The City of Swan will adjust the bond on the proponent, as appropriate, commensurate with the expanded area of the excavation.

Notes

- 1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment over the fulfilment of the requirements of the conditions.

Dr Judy Edwards MLA
MINISTER FOR THE ENVIRONMENT; SCIENCE

22 NOV 2005

Schedule 1

The Proposal (Assessment No. 1432)

The proposal is to conduct clay excavation operations.

The Key Proposal Characteristics are shown in Table 1.

Table 1 – Key Proposal Characteristics

Element	Quantities/Description
Offset	The transfer to the State of Western Australia, at no charge, of 5.97 hectares of Lot 12 Lexia Avenue (eastern side) for addition to Ellen Brook Nature Reserve to provide additional habitat for the endangered Western Swamp Tortoise.
Existing extraction areas	A change to the numbering of the lots has occurred:- The new numbers are Lots 7, 60, 63, 64 and 20 Hallett and Copley Roads, Upper Swan (Replacing Part lot 1 and lots 222, 27, 26, 25, 28, and 7 Hallett and Copley Roads, Upper Swan).
Areas for extension of clay extraction	Lot 19 Copley Road, Lot 100 Great Northern Highway and Lots 19, 45 and 46 St Alban's Road, Upper Swan.
*Size of Clay Body	Approximately 4 million tonnes
*#Total Area of Disturbance	Approximately 109 hectares
*Rate of Extraction	Approximately 180,000 tonnes per year
Major Infrastructure	nil
Overburden	Between 1 and 6 million tonnes
Water Usage	nil

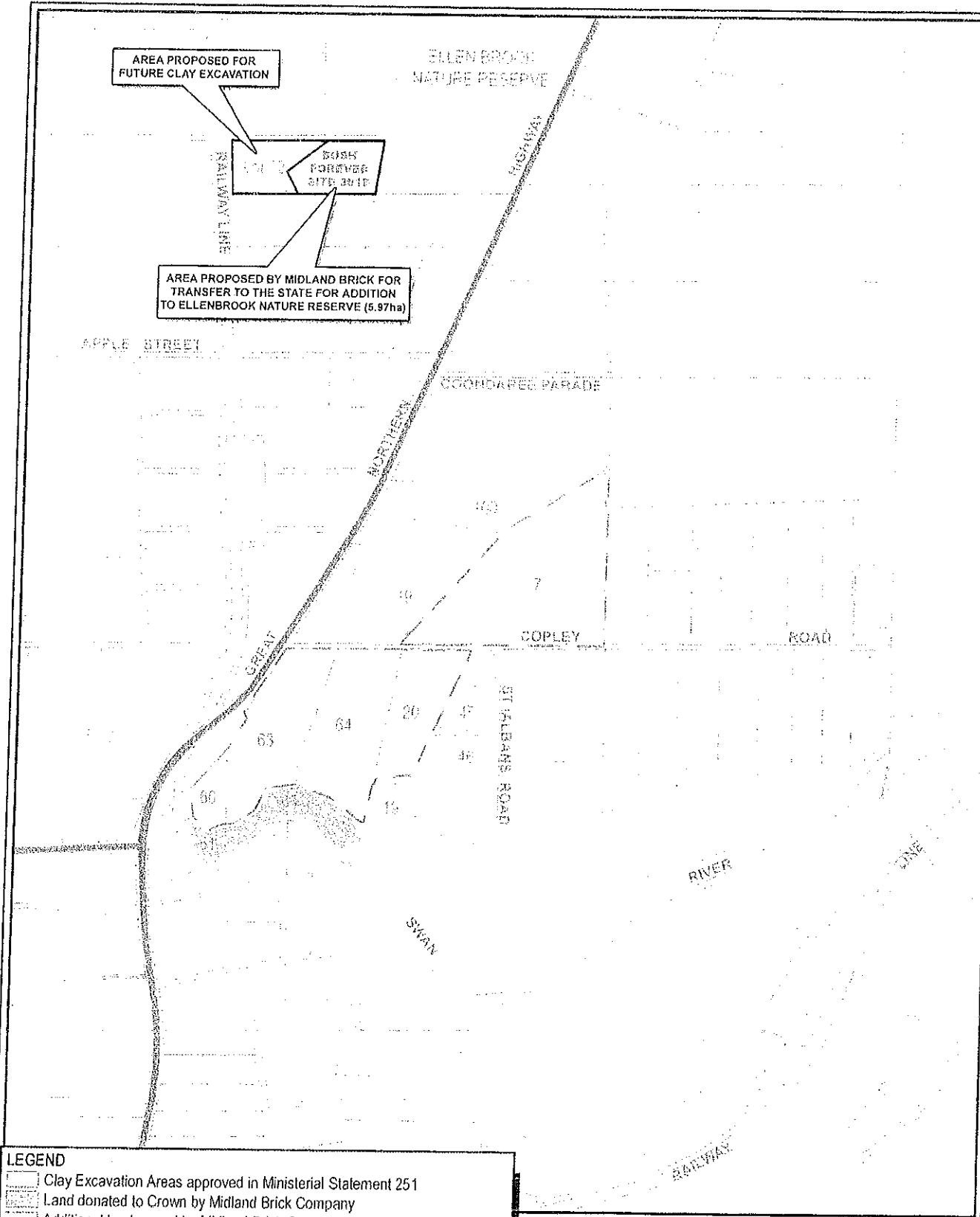
will also be rehabilitated.

* estimated at present usage.

Figures (attached).

Figure 1 - Location of current and proposed Midland Brick clay excavation.

Figure 2 - Aerial photo of current and proposed Midland Brick clay excavation works and rehabilitation areas.



LEGEND

- Clay Excavation Areas approved in Ministerial Statement 251
- Land donated to Crown by Midland Brick Company
- Additional land owned by Midland Brick Company proposed for excavation
- Areas previously excavated and proposed for excavation
- Ellen brook Nature Reserve
- Bush Forever Site boundary
- Approved Boundary
- Additional Excavation Areas

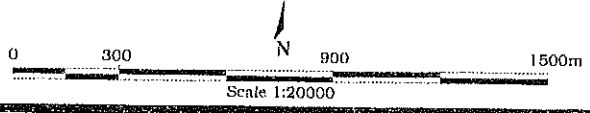
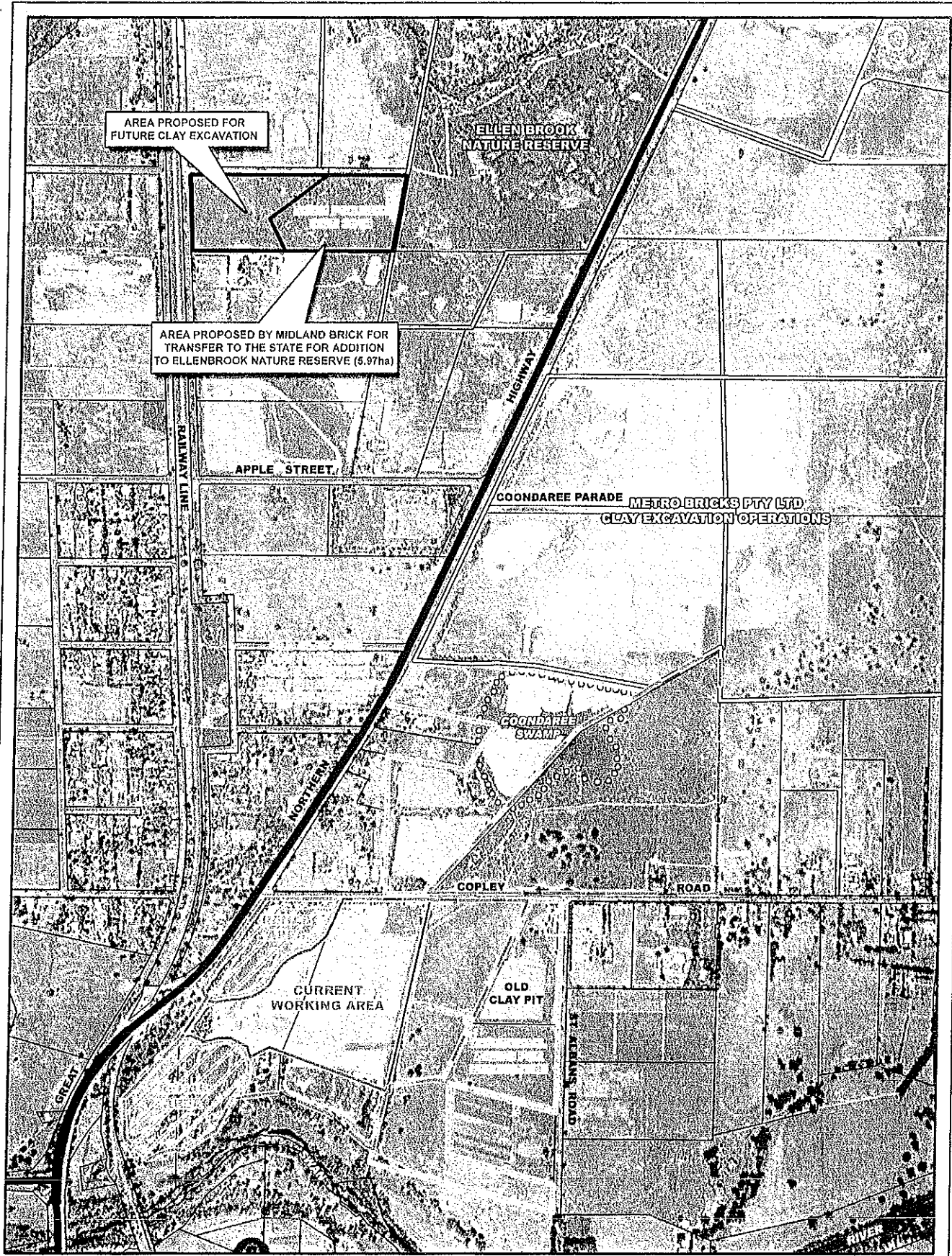


Figure 1

Clay Excavation Areas

A000033_05/02/04



LEGEND

- Approved Boundary
- Additional Excavation Areas

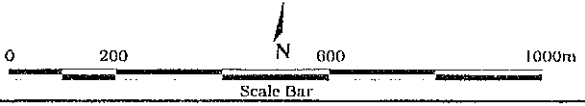


Figure 2

Aerial View of Site

4000953 05.02.04

Proponent's Environmental Management Commitments

CLAY EXCAVATION
LOTS 7, 19, 60, 63, 64 & 20 HALLETT & COPLEY ROADS
(formerly Part Lot 1 & Lots 222, 27, 26, 25, 28, & 7 Hallett & Copley Roads)
&
LOTS 19, 45 & 46 ST ALBAN'S ROAD
& LOT 100 GREAT NORTHERN HIGHWAY
UPPER SWAN

(Assessment No. 1432)

MIDLAND BRICK COMPANY PTY LTD

Proponent's Environmental Management Commitments
(consistent with commitments detailed in 1992)

CLAY EXCAVATION

LOTS 7, 19, 60, 63, 64 & 20 HALLETT & COPLEY ROADS
(formerly Part Lot 1 & Lots 222, 27, 26, 25, 28, & 7 Hallett & Copley Roads)
&

LOTS 19, 45 & 46 ST ALBAN'S ROAD & LOT 100 GREAT NORTHERN HIGHWAY
UPPER SWAN (Assessment No. 1432)

Note: The term "commitment" as used in this schedule includes the entire row of the table and its six separate parts as follows:

- commitment number;
- a commitment topic;
- the objective of the commitment;
- the 'action' to be undertaken by the proponent;
- the timing requirements of the commitment; and
- the body/agency to provide the technical advice to the Department of Environment.

No.	Topic	Objective	Action	Timing	Advice
1.	Transfer of land	To increase the size of the Ellen Brook Nature Reserve and provide additional protected habitat for the Western Swamp Tortoise.	The proponent will transfer 5.97 hectares of the eastern side of Lot 12 Lexia Avenue to the Crown. The area includes Bush Forever site number 301B.	Transfer should commence within six months following the issuing of the section 45(7) notice to the decision-making authorities (<i>Environmental Protection Act 1986</i>). Transfer should be finalised as soon as possible after the process begins.	CALM DPI

Abbreviations

CALM = Department of Conservation & Land Management
DPI = Department for Planning & Infrastructure

APPENDIX 3

Previous Environmental Assessments and Reports

APPENDIX 3: Previous Environmental Assessments and Reports

BBG (1997) Environmental Management Programme: Clay Excavation Lots 60,63,64,20 and 7 Copley Road Area, Upper Swan. Prepared for Midland Brick Company Pty Ltd, May.

RPS BBG (2001) Upper Swan Clay Excavations Regional Development, Drainage and Rehabilitation Strategy. Prepared for Midland Brick Company Pty Ltd, February.

RPS BBG (2004) Environmental Protection Act 1986 Section 46 Review: Midland Crick Clay Excavation Hallet and Copley Roads, Upper Swan. Prepared for Midland Brick Company Pty Ltd, December.

RPS BBG (2005) Acid Sulfate Soils Investigation and Management Plan- Lots 7, 19, 20 and 64 Copley Road and Lot 100 Great Northern Highway. Prepared for Midland Brick Company Pty Ltd. Unpublished, June.