



New Perth Bunbury Highway

Macaulay Extraction Management Plan

Sand quarry

Lot no. 1307

Mills Road, South Pinjarra

March 2007

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Executive Summary

Southern Gateway Alliance (SGA) proposes to develop the 40ha Macaulay sand pit. The site is located on Lot 1307 Mills Road, West Pinjarra and is 1.5km east of the New Perth Bunbury Highway (NPBH) in the Shire of Murray. The site occurs on rural private property owned by Mr. David Love and managed by Mr John Macaulay.

The proposed extraction sites will provide a major source of fill sand material for the NPBH project, which is being designed and constructed by SGA. It is expected that approximately 1.7 million m³ of material will be sourced from the site for the construction the NPBH over the period April 2007 to September 2008.

The Macaulay pit will be developed and operated under the provisions of the land Administration Act, 1997 and the Local Government Act, 1995.

Access between the pit and the NPBH alignment will be via Mills Road.

Perimeter fences and locked gates will be erected and maintained to prevent illegal entry to the pit sites. Warning signs will be erected and maintained as required by the Department of Industry and Resources (DoIR) and the Shire of Murray.

A minimum 20m buffer will be provided around the pit area to the external boundaries of Lot 1307, extending to 50 m wide along Mills Road, the east boundary and the northern half of the west boundary. This will provide a buffer for dust and noise impact.

The 50 m minimum buffer is also required to avoid impact on several Conservation Category and Environmental Protection Policy (EPP) listed wetlands within the vicinity of the project area. Pit drainage will be managed within the site to avoid impacting these wetlands and the Class C drainage reserve to the east of the project area.

Pit floor levels will be a minimum of 1m above the winter groundwater levels to avoid impacts on local groundwater and wetlands.

Operations at the site will be congruent with this Extraction Management Plan. Ongoing liaison will be conducted with the Shire of Murray during the development and operation of the site.

1. Introduction

1.1 Background

Construction of the New Perth to Bunbury Highway (NPBH) commenced in December 2006. Construction of the project will be conducted by the Southern Gateway Alliance (SGA), comprising Leighton Contractors, W.A. Limestone, GHD and Main Roads Western Australia.

It is estimated that construction of the road will require approximately 1.1 million m³ of limestone and 9 million m³ of sand. SGA has identified sites where suitable road building materials are located, one of these being the Macaulay Pit.

The proposed 40ha sand pit is located on Lot No 1307. The site is located on Mills Road, West Pinjarra, in the Shire of Murray, and is 1.5km east of the NPBH as shown at Figure 1.

Land use within the project area is predominantly agriculture. No reserves are located within the project area, however a drainage reserve is located approximately 250m east of the project area.

1.2 Proposal

SGA will establish a sand pit on Lot 1307 for the supply of fill sand for the NPBH, as shown on Figure 2. These sites are further detailed on the attached pit plans. Clearing will be required within the pit area.

It is expected that up to 1.7 million m³ of sand will be extracted from the site by SGA for the NPBH project, from April 2007 until September 2008. The duration of the NPBH project is expected to be from April 2007 to May 2009.

1.3 Proponent

The proponent for the extraction site will be the SGA. Management and support of the extraction will be by W.A. Limestone as part of SGA.

Contact can be made through:

Southern Gateway Alliance
Attention: David Della Bona
PO Box 1281
INNALOO WA 6918

1.4 Location and Ownership

The proposed sand pit is located on Lot 1307 Mills Road, West Pinjarra within the Shire of Murray as shown at Figure 2. The site is located 1.5km east of the NPBH alignment.

The land is private property owned by Mr. David Love, although it is managed by Mr. John Macaulay who acts on the behalf of the owner.

1.5 Description of the Resource

Significant reserves of Bassendean sand exist on the property. In general, the site comprises approximately 0.10 m of topsoil overlying up to 10 m of white and yellow sand, mapped as Guildford yellow duplex soils (Department of Conservation and Environment (DCE), 1980).

The sand will be used for embankment fill for the construction of the new highway.

Estimated depths of extraction are based on extraction to no deeper than 1 m above winter groundwater levels (2006/07 summer levels were adjusted upwards by 700 mm based on average historical seasonal variation at a monitoring bore on-site – Geotechnical-SGA, 2007). The result is that though the resource extends to depth, the extraction will be limited to no deeper than 9 m AHD.

1.6 Aims of the Proposal

SGA proposes to extract up to 1.7 million m³ of sand for the project.

The aims of the proposal are to:

- » Provide a major sand source for the NPBH project, which is strategically located near to the project, minimising the impact and cost of road constructing while reducing reliance on the local road network for cartage of materials to the project site.
- » Complete the final landform of the site as required by Shire of Murray.

2. Existing Environment

2.1 Climate

The climate of the project area is best described as Mediterranean with warm dry summers and cool wet winters. The closest Bureau of Meteorology weather-recording station to the project site is located at Mandurah Park, approximately 20 km north of the project area. The recorded climate data at Mandurah Park is summarised below.

Mean Annual Maximum Temperature Range: 17.3 °C (July) to 29.5 °C (February)

Mean Annual Minimum Temperature Range: 8.6 °C (July and August) to 17 °C (February)

Mean Annual Rainfall: 875.0 mm

Mean Annual Rain days per year: 119.8 days

(Bureau of Meteorology, 2004)

2.2 Geology and Soils

The project area is situated on the western Swan Coastal Plain, which occurs from Perth to Dunsborough. The project area traverses the Guildford formation, which is characterised by sandy clays to clayey sands, includes other alluvium, colluvium and wetland deposits. The topography of the area is relatively flat. The soils in the area have been mapped as Guildford and are yellow duplex soils (Department of Conservation and Environment (DCE), 1980).

Field tests indicate grey sand increasing in moisture content from the surface to a depth of 2 m, damp brown sand (coffee rock) from 2-3 m depth, and dry coffee rock below that (GHD, 2006).

2.3 Acid Sulphate Soils

The Western Australian Planning Commission (WAPC) Bulletin No. 64 identifies the likelihood of acid sulphate soils (ASS) occurring within the Swan Coastal Plain. According to the bulletin the likelihood of encountering ASS in the project area is for the most part *'moderate to low risk of actual acid sulphate soils (AASS) and potential acid sulphate soils (PASS) occurring generally at depths of > 3 m'* (WAPC, 2003).

Additional field assessment of ASS by Main Roads Materials Laboratory indicate that it is unlikely that ASS is present within the soils in the pit area (GHD, 2006).

2.4 Hydrology

The project area lies within the Peel-Harvey Catchment, which is approximately 70 km south of Perth.

The proposed Macaulay Pit is 5km east of Lake Mealup and 6km east of the Peel Harvey Estuary.

Surface water drainage will be managed within the pit site and the pit floor level will be maintained 1m above the winter groundwater level to avoid impact on groundwater and wetlands in the vicinity.

50m east of the proposed pit site is a Conservation Category wetland, and 200m east of this is Coolup Drain D. Another Conservation Category wetland occurs north east of the pit boundary. The landowner has cut channels linking the wetland and drain, with water flowing both ways in winter depending on water levels in the main drain. There are no major surface watercourses within the site.

2.5 Flora

The pit site has been extensively cleared and used for grazing for many years. Remaining native vegetation is restricted to isolated patches and individual trees.

Searches of the DEC flora database and the Western Australian Herbarium (WAHERB) records indicate that the Declared Rare Flora (DRF) *Drakaea micrantha* is known to exist approximately 1km south west of the pit site.

No DRF and or Priority Flora occur within the project area.

2.6 Threatened Ecological Communities

No TECs listed under the *EPBC Act* occur within the study area. The study area occurs within the TEC buffer for Lake Clifton.

2.7 Environmentally Sensitive Areas

Interrogation of the DEC's web based Native Vegetation Map Viewer and field investigations confirmed that the proposed pit site does not occur within an area considered to be an Environmentally Sensitive Area.

2.8 Vegetation

The original vegetation of the project area consisted of the Guildford complex. The Guildford complex vegetation is a mixture of open forest to tall woodland of *Corymbia calophylla-Eucalyptus wandoo-Eucalyptus marginata* and woodland of *Eucalyptus wandoo* (with rare occurrences of *Eucalyptus lane-pooli*). Minor components include *Eucalyptus rudis-Melaleuca raphiophylla* (Department of Conservation and Environment (DCE), 1980). The percentage of this vegetation complex remaining (1997/1998) in the System 6/part System 1 area is 5% (EPA, 2006).

A vegetation assessment for the project area (GHD, 2006) found the vegetation to be rated very degraded. Descriptions of vegetation conditions can be seen in Table 1.

The vegetation consisted of *Eucalyptus marginata*, *Corymbia calophylla* and infrequent *Allocasuarina fraseriana* with some planted tree lucerne and *Acacia saligna*.

Understorey was limited to exotic annual grasses and pasture weeds.

The area has been heavily disturbed due to agriculture. The original vegetation structure is not present.

Table 1 Vegetation Condition Assessment

Scale	Criteria
Pristine (1)	Pristine or nearly so, no obvious signs of disturbance.
Excellent (2)	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive.
Very good (3)	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback and grazing.
Good (4)	Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or the ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded (5)	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely degraded (6)	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

2.9 Weeds

Heavy disturbance due to agriculture has resulted in the germination of weed seed present at the site. Exotic annual grasses and pasture weeds comprise the understorey with some planted *Cytisus proliferus* (tree lucerne - exotic) observed.

No Declared Weeds listed under the *Agriculture and Related Resources Protection Act (1976)* have been identified.

2.10 Dieback Disease (*Phytophthora cinnamomi*)

The project area has been determined as dieback 'uninterpretable' as indicator plants are too few to determine the presence or absence of disease caused by *Phytophthora cinnamomi*. This includes the strip of wetland area located east and outside of the proposed resource area.

2.11 Wetlands

There is a conservation category wetland located within the project area. The majority of this wetland is located adjacent to the eastern boundary of the project area. Another conservation category wetland is located approximately 50m from the northwestern corner of the pit site. This wetland is also classed as an EPP lake.

Additional EPP lakes and geomorphic wetlands exist within the vicinity of the project area however they are situated at a distance greater than 200m from the project area.

The location of these geomorphic wetlands can be seen at Figure 2.

2.12 Fauna

The conservation status of fauna species is assessed under the Western Australian *Wildlife Conservation Act* (1950) and the Commonwealth's *EPBC Act* (1999), with the significance levels for fauna used in the *EPBC Act* those recommended by the International Union for the Conservation of Nature and Natural Resources (IUCN). In addition, the DEC produces a supplementary list of Priority Fauna, being species that are not considered threatened under the Western Australian *Wildlife Conservation Act* (1950) but for which the DEC feels there is a cause for concern.

Of the 23 fauna threatened or priority species identified by the Commonwealth Department of Environment and Water Resources (DEWR) and DEC as occurring or likely to occur in the vicinity of the project area (GHD, 2006), most have no suitable habitat within the project area. The remainder, including the Lined Skink and Rainbow Bee-eater, are highly mobile and have wide distribution ranges.

To determine the potential impact of development of the Macaulay Pit on Black Cockatoos an assessment was conducted by Dr Ron Johnston (Johnstone et al, 2007) on 24 and 25 February 2007. The purpose of the survey was to assess the value of remnant vegetation in the proposed pit site as possible nesting and feeding sites for Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Baudin's Cockatoo (*Calyptorhynchus baudinii*) and Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).

The scattered trees were noted as providing some feeding habitat for Forest Red-tailed Black Cockatoos. One possible nest tree was located just outside the proposed pit area in a large patch of remnant vegetation. It was concluded that the clearing of vegetation from this site would not impact on the availability of breeding, feeding and roosting habitat for black cockatoos, or cause a decline in local populations

None of the species identified would be significantly impacted by the project.

2.13 Heritage Issues

A Department of Indigenous Affairs (DIA) database search was performed and no Aboriginal heritage sites were located within the project area. However, an Aboriginal heritage site is located approximately 1km to the south of the project area, Nine Mile Lake. This site will not be impacted by the materials pit due to its distance from the project area.

A desktop study of European heritage sites concluded that no European heritage sites were located within or in close proximity to the project area.

2.14 Issues of National Environmental Significance

A review of the Commonwealth Department of Environment and Water Resources (DEWR) online database indicated no environmental impacts or issues for the project considered to be of National Environmental Significance that would require the project to be considered as a 'Controlled Action' or invoke the Commonwealth *Environmental Protection and Biodiversity Conservation Act, 1999*.

2.15 DEH Approval Conditions

Approval for the New Perth to Bunbury project was given by Commonwealth Minister for the Environment and Heritage on 7 December 2006 subject to conditions, several of which relate to materials sources for the project. These include:

- No native vegetation will be cleared to access the road construction materials
- The site is not located within 500m of a major tributary of the Peel Harvey Estuary.
- Extraction of materials will not result in the disturbance of acid sulphate soils (ASS).

The highly degraded nature of the vegetation to be impact for the Macaulay Pit is considered to comply with the clearing condition.

The proposed Macaulay Pit is 5km east of Lake Mealup and 6km east of the Peel Harvey Estuary.

Development of the site will not impact on ASS materials.

Main Roads WA is current seeking confirmation from DEWR to confirm compliance with the Commonwealth environmental approval conditions.

3. Planning Issues

3.1 Land Use

The current use of Lot 1307 is predominantly cleared agricultural land, used for grazing approximately 40 cows with a small caretakers house located at the south-east corner. The properties surrounding the proposed sand pit are generally rural properties with similar uses. The identification of residences within proximity of the pit site was undertaken through aerial photography assessment.

The one residence located approximately 100m from the project area within lot 1307 may be impacted by dust, noise and/or vibration. No other private residences are located within 500 m of the pit site.

A 11.3 ha 'C' class drainage reserve (No. R23333) vested in the Department for Planning and Infrastructure is located on the eastern boundary of Lot 1307, which is approximately 250 m from the edge of the planned pit area.

An 113.06 ha 'A' class reserve (No. R16907) vested in the Department of Environment and Conservation is located approximately 1 km south of the project area. The proposed materials pit is not anticipated to impact this reserve.

The location of these reserves can be seen at Figure 2.

3.2 End Use

The owner of the property wishes to continue using the property (once all of the sand has been removed) for grazing. Final landform and rehabilitation of the site will be conducted in conjunction with the landowner.

3.3 Final Contours

The interim landform is as per the attached finished contour plan (Figure 3) with batters made safe at a maximum of one vertical to two horizontal (1V:2H) prior to handover on project completion.

4. Consultation

4.1 Liaison with Shire of Murray and DEC

SGA will liaise with Shire of Murray during operation of the pits and comply with any specific site operating requirements including transport routes, site access, fencing and on-going site management during the period of extraction. This will ensure that extraction operations do not compromise worker safety, public safety and future uses of the site.

SGA will develop a Memorandum of Understanding with the landowner to ensure that extraction operations do not compromise future uses of the site.

5. Project Description and Management

5.1 Extraction and Processing

It is expected that there will be little or no materials processing required during operations of the pit sites. Sand will be extracted in bulk for fill sand only, and requires no processing.

Excavation will be conducted congruent with the *Mines Safety and Inspection Act (1994)* and *Mines Safety and Inspection Regulations (1995)*.

Excavation Methods

Excavation will be carried out in the sequence as described below:

1. All trees will be cleared, with stumps and branches removed and trunks placed in a location directed by the owner for later use. Unsalvageable tree waste will be burnt on site by SGA.
2. Topsoil will be removed to a depth of 100 mm and stockpiled on-site. Respreading of the topsoil will be conducted at the completion of pit operations. Where possible topsoil clearing will be undertaken in wetter months to minimize dust lift.
3. Sand will be excavated in a general west to east face to a maximum depth of 9m RL AHD.
4. Excavation methods will be sand loading direct from the face to trucks.
5. All static equipment will be located on the quarry floor to provide visual and acoustic screening.
6. Pit drainage will be designed such that water does not drain into the better condition vegetation adjacent to the southern boundary of Lot 1307, or into the Class C drainage reserve to the east of lot 1307.
7. At the completion of the excavation stages, the quarry floor will be left neat and tidy and topsoil re-spread to a maximum depth of 100mm.
8. A minimum 20m buffer will be provided around the pit area to the external boundaries of Lot 1307, extending to 50 m wide along Mills Road, the east boundary and the northern half of the west boundary. This provides benefits for noise, dust, fire hazard, waterbird habitat and weed infestation of surrounding bush and wetlands. The EPA and DEC provides separate guidelines on buffer requirements for appropriate land use near wetlands.
9. No clearing will be conducted beyond the pit area and/or site infrastructure.
10. At the completion of extraction activities the pit batters shall be left with a maximum of one vertical to two horizontal (1V:2H).

Landform Reconstruction and Contouring

1. The final landform by SGA will be a flat floor of RL 9 m as per Figure 3.
2. Interim slopes will be at angle of repose and batters made safe on both tops and toes.
3. At the completion of excavation activities the quarry floor will be left neat and tidy and topsoil respread to a maximum depth of 100mm.

5.2 Staging and Timing

The pit area will be worked continuously from April 2007 through to September 2008, or sooner if productivity exceeds our estimates.

5.3 Hours of Operation

Hours of operation will to be 6.00am to 6.00pm Monday to Saturday inclusive. There will be no operations on Sundays or public holidays.

5.4 Noise Management

There is one residence approximately 100m from the project area within lot 1307. To help reduce noise impacts all static equipment to be used (such as crusher, screen, etc.) will be located on the quarry floor to provide acoustic screening.

Noise management will be initiated during pit operations in accordance with AS2436-1981. Excavation activities are required to comply with the *Environmental Protection (Noise) Regulations (1997)* and comply with the requirements of the Shire of Murray.

No other residences are located within 500 m of the pit site, which should allow a suitable buffer for reducing the impacts of dust, noise and/or vibration during the development and operation of the pit site.

Excavation activities are required to comply with the *Environmental Protection (Noise) Regulations (1997)* and comply with the requirements of the Shire of Murray.

For activities outside of 7.00am to 7.00pm Monday to Saturday inclusive (excluding public holidays) the following measures will be fulfilled

- » the equipment used must be the quietest reasonably available
- » SGA must show that it was reasonably necessary for the work to be done out of hours
- » SGA will submit for approval to the CEO of the Shire of Murray a noise management plan at least seven days before the commencement of any works outside of the standard hours of operation. The plan will include details of:
 - the need for the work to be done out of hours
 - the types of activity which could be noisy
 - predictions of noise levels
 - control measures for noise

- monitoring of noise, and
- complaint response.

5.5 Access, Transport and Security

External site access is expected to be from Mills Road, which will be upgraded and sealed to facilitate this movement. The number of truck movements on to Mills Road is expected to range between 300 and 600 per day, depending on the program.

The site has existing fencing which will suffice for the DoIR requirements. Any extra fencing required will be installed as a three-strand barb wire and steel star picket fence. Warning signs will be installed along the fence at 200m intervals.

The haul routes that are proposed to be used from the pit site would be Mills Road (from the quarry site through to Thompson Road), Thompson Road (whole road), Daley Road (from Thompson through to alignment), Paull Road (from Thompson through to alignment) and Greenlands Road (from Thompson through to alignment).

Using these key roads with a combination of the alignment itself will provide SGA with flexible transport access routes from the Macaulay pit to the required destination.

Note: These haulage routes are specifically for the Macaulay Pit. Other routes will need to be discussed with the Shire of Murray regarding the sand haulage at the Southern Cut, limestone and basecourse materials, and possible borrow pits in the northern zone of the project around Nambelup and Ravenswood.

A dilapidation survey of the proposed haul roads to be used has been conducted by an independent contractor commissioned by SGA. SGA will monitor and maintain these roads during construction, repairing any damage to the roads that has been caused by haulage trucks for this project. It is expected that the roads will be left in a similar state as to when the project began.

5.6 Site Infrastructure and Equipment

All static and operational equipment will work on the quarry floor to provide maximum acoustic and visual screening. Listed below are all possible equipment items that may be used during operation of the sites.

Table 2 Equipment items that may be used during operation of the sites

Item	Use
Site office and/or container(s)	Required for management and security
Toilet system	A serviced portable WC will be on site at times of operation if local facilities are not available
Bulldozer	Ripping, track rolling and pushing of primary raw feed
Screening Plant	Screening product to clean or size
Loader	Loading the above plant and trucks
Water Tanker	Dust suppression on access roads and working floors. Water from off site

5.7 Workforce

The site workforce is expected to vary during the period of operations. A maximum of 10 persons is expected to be on-site at any time during the operation.

5.8 Water Supply

Water will be used for wash down and dust suppression as required.

Water is expected to be sourced from supplies developed for the construction of the NPBH.

Potable water will be brought to the site as required.

5.9 Safety

The excavation area will be approximately 10m deep at its maximum. All batters will be bunded on top and toes filled when not in use. This will comply with Mines Regulations and is in keeping with site safety considerations.

Appropriate warning signs as required by DoIR will be erected on the pit security fences around the site.

All site employees will be supplied with appropriate noise protection equipment, and will be instructed in the correct use of noise protection equipment and the potential for hazard reduction.

Noise management will comply with the provisions of the *Mines Safety and Inspection Act 1994 (WA)* and *Mines Safety and Inspection Regulations (1995) WA*.

5.10 Dust Management

Dust creation from the site and cartage operations will be managed by the following methods:

1. Water tankers will be maintained on site during excavation when there is a risk of generating excessive dust.
2. Water will be used to reduce dust lift from the pit floor, access roads and from trucks and machinery.
3. All trucks travelling on public roads will have their loads covered.
4. Topsoil and overburden stripping and respread will be confined to the wetter months, April to October, where possible.
5. Where it is found that vehicles leaving the site have dropped excessive soil material onto the adjacent sections of Mills Road these sections will be swept on an as needs basis to reduce the potential for dust generation and maintain traffic safety.
6. All site employees will have access to efficient dust masks for use as required.
7. The Quarry Foreman will make the decision that where dust management techniques have failed and/or unfavourable weather conditions arise whereby dust cannot be controlled, the operation may be ceased until such time that dust management is under control.

5.11 Fuel and Lubricant Storage

Diesel fuel will be either delivered to the site as required or alternatively a 50 000 L fuel tank may be installed on-site. Lubricants such as oil and grease for regular machinery maintenance will be stored on-site during the extraction operations. No other potential chemical pollutants will be kept on-site.

Management of fuel and lubricants will be conducted by the following methods:

1. Fuel, if stored on site, will be stored a tank surrounded by bunds and lined with an impermeable membrane, to prevent leakage and possible contamination of the ground water. Storage will be to DoIR and DoW requirements.
2. A spill response kit will be maintained on-site.
3. Minor spills will be recovered immediately.
4. A serviced portable or septic toilet system will be used on-site.
5. Major servicing and repairs of large machinery is not expected to be conducted on-site. Should such activity be required they will be conducted within an area lined by an impermeable membrane in compliance with DoW Guidelines (W&RC, 2000).
6. DoW will be notified of any fuel or oil spill of greater than 5 litres.
7. Any fuel and /or chemical spills will be reported through the SGA Incident reported process.

5.12 Vehicle and Machinery Hygiene

The pit site has been considered as dieback 'uninterpretable' as indicator plants are too few to determine the presence or absence of disease caused by *Phytophthora cinnamomi*. This rating is a reflection of the absence of original understorey due to clearing. In addition a number of weed species have been identified on-site.

To minimise the potential for the spread of dieback and weeds to the sites, and to other sites, the following hygiene measures will be followed.

1. All clearing, topsoil/overburden stripping and spreading activities should be conducted under dry soil conditions. Dry soil conditions are defined as when soil does not stick or adhere to vehicle tyres and tracks in sod or clumps.
2. All plant and machinery should be cleaned free of all soil and vegetative material
 - prior to arrival within the project area; and
 - prior to departing the project area.

Clean down may comprise of the use of a brush and/or compressed air to remove clods of soil and/or soil water slurry. A metal bar or spade may be used to remove compacted soil where necessary. Dust adhering to the sides of vehicles does not need to be removed.

3. Raw materials sourced from the project area should only be used in areas of the same dieback status that have been determined as unprotectable.
4. Haulage movements will be conducted on the defined access roads/tracks.

5.13 Fire Protection

There is expected to be a low fire risk from sand mining operations of this nature as the pit site will form a natural firebreak. However, there is potential for large machinery to ignite a fire during the construction and operation of the materials pit. Fire risk will be managed by the following actions:

1. Perimeter firebreaks will be maintained as required.
2. No burning will be permitted within the operating area.
3. Machines and vehicles will be restricted to cleared areas.
4. SGA will conform to any specific requirements for fire prevention requested by the Shire of Murray, Department of Environment and Conservation and/or the Fire and Emergency Services Authority.
5. The water for dust minimisation will be available for fire fighting.

5.14 Rubbish Disposal

Domestic site rubbish will not be disposed of by burning. All domestic rubbish, site effluent and other rubbish will be disposed of at an authorised waste disposal site, or a site agreed with the Shire of Murray.

6. Environmental Compliance and Monitoring

SGA is responsible for the operation of the pit sites in line with the environmental management measures detailed in this document.

During the pit operations compliance with environmental management measures will be regularly monitored. Any non-conformances will be addressed at the first opportunity and any improvement actions implemented.

The monitoring program for dust and noise is to ensure that the management actions contained in this management plan are being applied, and to continually assess the potential for or occurrence of relevant complaints. This program is detailed in the table below.

The responsibility for monitoring during extraction operations will be undertaken by SGA, in particular by the Materials Manager and Environmental Manager / Environmental Officer on a fortnightly basis and Foreman / Site Manager on a daily basis. All individuals involved in the extraction process will have some responsibility for monitoring activity, which will be outlined as part of their site induction.

Table 3 Extraction Environmental Monitoring Program

Topic	Parameter	Frequency/ Duration	Responsibility ²	Location	Purpose
Noise	Noise monitoring using methods outlined in AS 2436-1981	Daily	EM	Entire extraction site	To avoid nuisance to occupants of areas surrounding NPBH
		Opportunistic	SM, C/SP		
	Integrity of noise control equipment	As part of extraction site inspections	SM, C/SP	Entire extraction site	To ensure noise control measures are in good working order
Dust	Dust monitoring	Daily	EM	Entire extraction site	To monitor dust generation and determine if dust suppression required
		Opportunistic	SM, C/SP		
		Dust from stockpiles	Daily Opportunistic		
	Dust on vegetation	Weekly Opportunistic	SM	Entire extraction site	To assess impacts of dust on vegetation
Spills	Fuel and / or chemical spills to be reported through SGA Incident procedures	As required	SM	Entire extraction site	Record and clean-up any spills

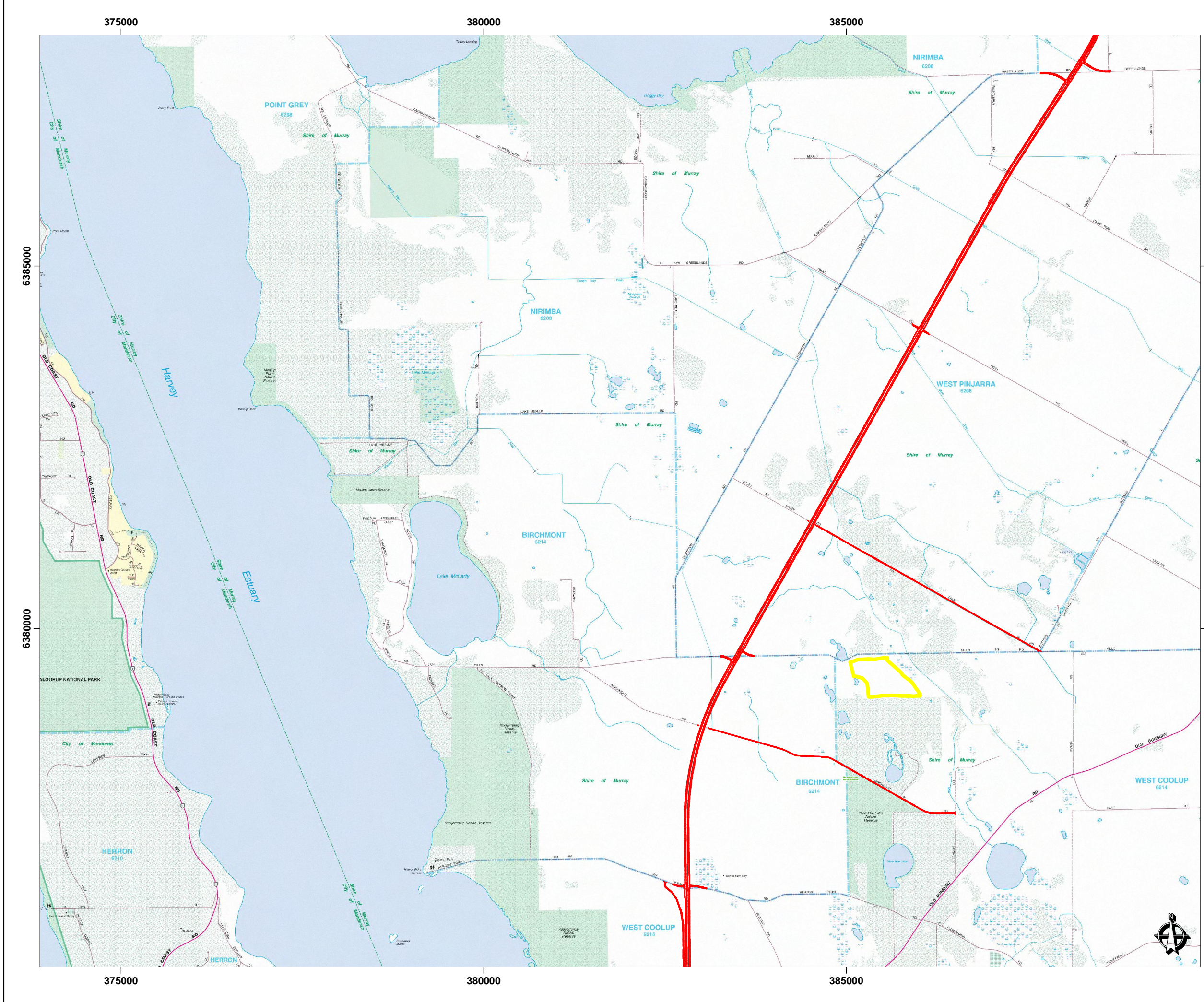
² Responsibilities are abbreviated as follows: Environmental Manager (EM), Foreman/Site Manager (SM), Contractors/Site personnel (C/SP).

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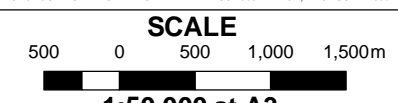
Figure 1
Locality Map



LEGEND

- DCT Alignment
- Proposed Macauley Pit Boundary

MAP UNITS PROJECTED IN MGA ZONE 50
 NOTE THAT POSITIONAL ERRORS CAN BE > 5M IN SOME AREAS
 BACKGROUND SREETSMART STREETEXPRESS 2006 EDITION, PRODUCED 2005



**1:50,000 at A3
 LOCALITY MAP**



Peel Region

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 HEIGHT DATUM: METADATA RECORDED:

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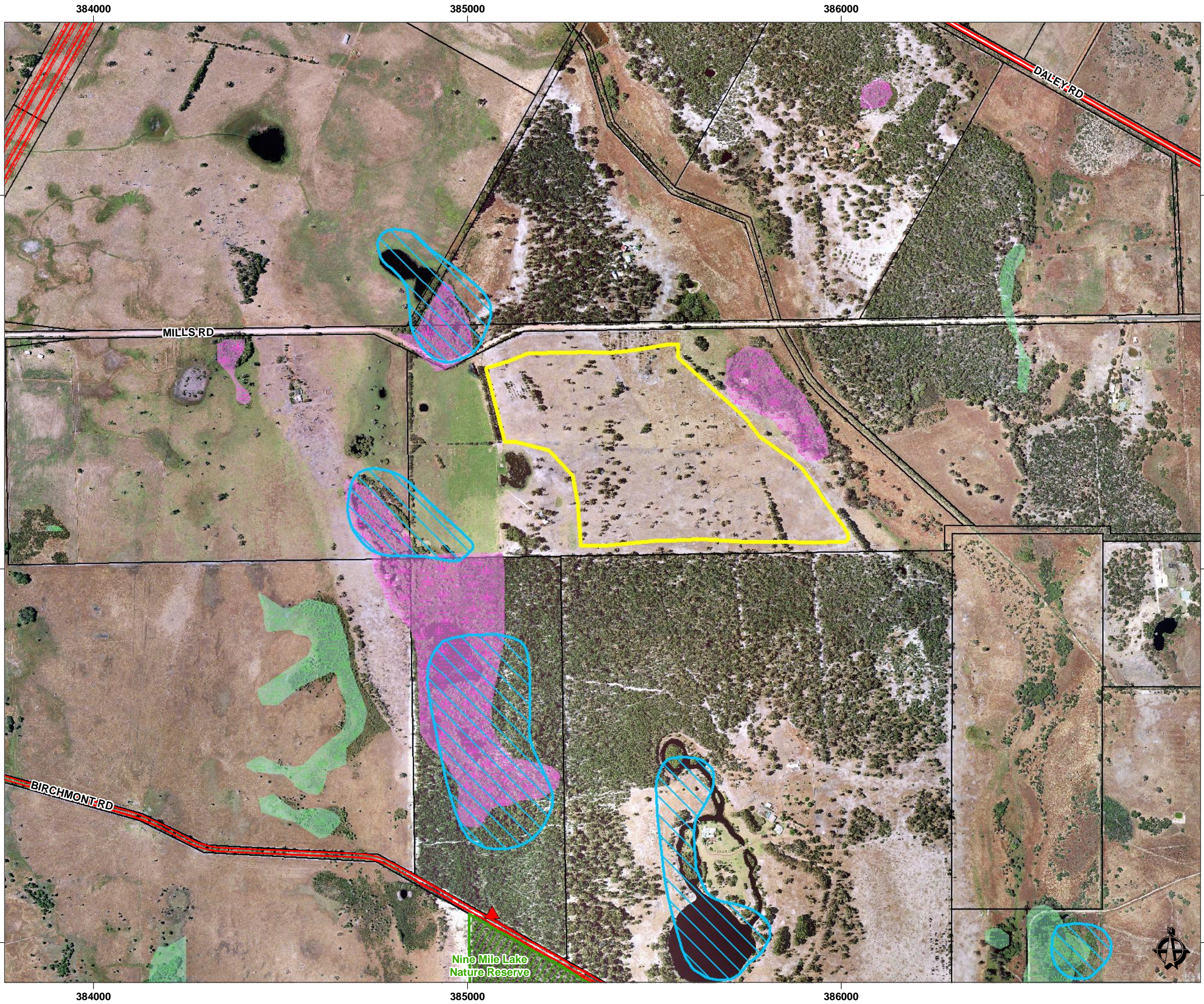
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**NEW PERTH BUNBURY HIGHWAY
 MACAULEY PIT EXTRACTION MANAGEMENT PLAN**

Figure 1
 Site Locality

Figure 2
Environmental Constraints

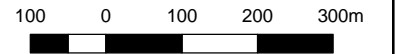


LEGEND

- DCT Alignment
- Proposed Macauley Pit Boundary
- Declared Rare & Priority Flora**
- ▲ (R) Declared Rare Flora - Extant Taxa
- ▲ Priority 4 - Rare Taxa
- ▲ Priority 3 - Poorly Known Taxa
- ▲ Priority 2 - Poorly Known Taxa
- ▲ Priority 1 - Poorly Known Taxa
- CALM Managed Lands
- EPP Lakes (1992)
- Geomorphic Wetlands**
- Conservation
- Resource Enhancement
- Cadastral Boundaries

NOTE THAT POSITIONAL ERRORS CAN BE > 5M IN SOME AREAS
AERIAL PHOTOGRAPHY DATED DEC 2006 SOURCED FROM MRWA SEPT 2006

SCALE



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LOCALITY MAP



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**NEW PERTH BUNBURY HIGHWAY
MACAULEY PIT EXTRACTION MANAGEMENT PLAN**

Figure 2
Environmental Constraints

Figure 3
Proposed Extraction Levels

NOTE: ALL DRAWINGS ARE CONSIDERED UNCONTROLLED UNLESS STAMPED, CONTROLLED COPY IN RED



NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE
2. MILLS ROAD LOCATION IS APPROXIMATE ONLY

LEGEND:

- FENCE
- FENCE - TEMPORARY



1:2000

SCALE

PROJECT TITLE		NEW PERTH BUNBURY HIGHWAY	
DRAWING TITLE	MILLS ROAD INTERSECTION	DRAWING NUMBER	15.10-RW-SK-003
MACAULAY FARM MINING PLAN		LOCAL AUTHORITY	PERKIN DRAYTON WA
INDIVIDUAL VERIFIER	DESIGN MANAGER	ALLIANCE PROJECT DIRECTOR	APPROVED
DATE	FEB 07	DATE	FEB 07
DRAWN	E. HIRSCH	CHECKED	
DRAWING PATH		G:\16\18783\CAD\CIV\15. Mills Road Intersection\Sketches	



METADATA	
GROUND SURVEY STANDARD	67-08-43
DATE OF CAPTURE	APRIL 2004
MAPPING SURVEY STANDARD	
DATE OF CAPTURE	
MAIN ROADS PROJECT ZONE	PCG94
HEIGHT DATUM	AHD

REV	DATE	DESCRIPTION	APPROVED

Document Status:

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
01	Shane Collins	Neil McCarthy	<i>N. McCarthy</i>	John White	<i>[Signature]</i>	8/3/07