



CLIENTS | PEOPLE | PERFORMANCE

Main Roads Western Australia

Shire Pit 9 Pit Management Plan

December 2010



Contents

1.	Introduction	1
2.	Gravel Pit Operations and Management	3
2.1	Rare Flora	3
2.2	Aboriginal Heritage	3
2.3	Pit Boundaries	3
2.4	Gravel Pit Access	3
2.5	Dieback and Weed Management	4
2.6	Pit Clearing	5
2.7	Gravel Crushing and Topsoil Management	6
2.8	Pit Drainage	6
2.9	Fire Management	6
2.10	Pets and Firearms	7
2.11	Fuel and Chemical Storage	7
2.12	Rubbish Disposal	7
2.13	Gravel Cartage	7
2.14	Pit Rehabilitation	8
2.15	Monitoring of Pit Management	9
3.	References	10

Table Index

Table 1	Summary of Environmental Management Requirements	15
---------	--	----

Figure Index

Figure 1	Locality Map	12
Figure 2	Proposed Clearing Area	13

Appendices

A	Summary of Environmental Management Requirements
---	--



1. Introduction

This Pit Management Plan (PMP) has been prepared for Main Roads Western Australia (Main Roads), on behalf of the Shire of Jerramungup, for the planned development of the Shire Pit 9. The proposed pit is located in the Shire of Jerramungup adjacent to Devils Creek Road. Devils Creek Road is located to the north east of Bremer Bay as shown in Figure 1. Gravel sourced from the pit site will be extracted and used for the upgrading of nearby sections of Collets Road by the Main Roads Great Southern Region.

A Preliminary Environmental Impact Assessment (GHD, 2010b) prepared for the development of the pit has concluded that clearing operations can be conducted under the provisions of the Main Road Statewide Purpose Clearing Permit 818/4.

The pit area will be developed and rehabilitated over one construction season as the gravel is required for the upgrading of Collets Road. Shire Pit 9 is 6.65 ha in total and will be developed in two stages. Stage 1 consists of 2.43 ha and is located within road reserve. Stage 2 is 4.22 ha and is positioned on vacant crown land (Figure 2). Along the east section of the Stage 2 development there is an area of the pit (1.37 ha) that has not been surveyed or reported on. This land has been identified as a contingency and is not covered in this PMP. It is expected that approximately 15 000m³ of gravel will be won from the pit area for road construction purposes.

Pit 9 is one of the dieback free gravel resources identified for the upgrade of Swamp Road.

This PMP details environmental management measures to minimise and manage the expected impacts of the gravel extraction and cartage operations, and provide for the rehabilitation of the site. Management measures detailed in this report will be included in the tender documents for the gravel crushing contract prepared by the Main Roads and will be applied by the Main Roads, when transporting gravel from the site and when rehabilitating the pit area.

The Pit Management Plan addresses the following issues related to the proposed gravel pit planning, development and rehabilitation:

- Rare flora
- Aboriginal heritage
- Pit boundaries
- Gravel pit access
- Dieback management
- Pit clearing
- Gravel crushing and topsoil management
- Pit drainage
- Fire management
- Pets and firearms
- Fuel and chemical storage
- Rubbish disposal
- Gravel cartage



- ▶ Pit rehabilitation, and
- ▶ Monitoring of pit management.

A summary of the specific management measures is included in Appendix A, which is designed for use as a 'stand alone' Environmental Management Plan for the project.



2. Gravel Pit Operations and Management

It is proposed that Shire Pit 9 will be developed and rehabilitated in two stages and used for roadworks on nearby sections of Swamp Road. A locality map of the proposed pit area is shown in Figure 1 and the proposed clearing area, development stages and vegetation types are shown in Figure 2.

The following section identifies management actions to be followed during the development and rehabilitation of Shire Pit 9 and the transport of gravel to roadworks on Swamp Road. For each management measure the relevant organisation responsible for that management measure is identified.

2.1 Rare Flora

A flora survey of 5.28 ha of the proposed gravel pit area was conducted by a botanist from GHD during spring 2010 and a report compiled (GHD, 2010a).

No Declared Rare Flora species as listed by the DEC or species of national conservation significance listed under the EPBC Act were recorded from the Study Area. One P2 Priority Flora species *Hibbertia acrotichion* was identified as occurring within Shire Pit 9 survey area (GHD, 2010b).

2.2 Aboriginal Heritage

Ethnographic and archaeological surveys of 5.28 ha of the pit site were carried out by Brad Goode and Associates (2010) and David Guilfoyle, Applied Archaeology Australia (2010). No artefacts were found at Shire Pit 9 (Goode, 2010, Guilfoyle, 2010). These surveys included site visits and consultation with representatives of the Aboriginal Community. The representatives did not raise any objections or concerns regarding development of Shire Pit 9.

Land tenure for Stage 2 development of this pit is vacant crown land. As a result access to this section is subject to the Native Title Act 1993. Negotiations should be conducted with The South West Aboriginal Land and Sea Council prior to further development.

Action / Responsibility: Main Roads Project Manager

2.3 Pit Boundaries

Prior to the commencement of any works in the pit area the pit boundaries will be marked to ensure that they are clearly visible from within the site.

Action / Responsibility: Main Roads Project Manager

2.4 Gravel Pit Access

Access to Shire Pit 9 from Devils Creek Road will be via a new access track between Devils Creek Road and the pit site. The access track will be developed by the removal of vegetation and sheeting with gravel to provide the standard required for heavy vehicles.



Action / Responsibility: Main Roads Project Manager

Vegetation removal will be kept to a minimum and be determined for the safe use of the track, removal of vegetation will be conducted under the dieback hygiene conditions detailed at Section 2.5 below.

Action / Responsibility: Main Roads Project Manager

Access track development will be carried out under dieback hygiene conditions detailed in Section 2.5 below.

Action / Responsibility: Main Roads Project Manager

Truck turn-around loops will be developed within the pit area.

Action / Responsibility: Main Roads Project Manager

2.5 Dieback and Weed Management

Dieback (*Phytophthora cinnamomi*) mapping conducted by DEC in 2010 showed that the surveyed section of the pit is dieback free.

No weeds were noted in the surveyed section of Shire Pit 9.

Action / Responsibility: Main Roads Project Manager / DEC

All activities associated with the pit clearing, vegetation mulching, gravel crushing, stockpiling, cartage operations and rehabilitation works will be conducted under the following dieback hygiene conditions:

1. All contractors and site employees will be advised of the *Phytophthora cinnamomi* management measures.
2. Signs indicating that the pit site is dieback free and that vehicles are to be 'Clean on Entry' will be installed on the pit access track adjacent to the intersection of Swamp Road.
3. Operations and gravel cartage from the pit will be conducted under dry soil conditions. Dry soil conditions are defined as when soil does not clod, adhere or accumulate on plant or vehicles. Should rainfall create wet soil conditions during pit operations split phase operations will be introduced. If there is any rainfall event of more than 7.5mm works will be suspended. When transitioning from split phase operations to dry phase operations, the site Environmental Officer shall certify that conditions have returned to allow dry phase operations and all plant that was used during split phase operations shall be cleaned and recorded as cleaned by the Site Environmental Officer. Split phase loading areas shall be barriered off to prevent access during dry phase operations.
4. The gravel crushing plant and associated machinery will be cleaned free of all soil and plant material prior to arrival and departing the site. Clean down will comprise of:



(a) The use of a brush and / or compressed air to remove clods of soil and /or soil water slurry. A metal bar or spade will be used to remove compacted soil where necessary;

Alternatively,

(b) Water used for washdown and dust suppression will be sourced from a domestic mains water supply, from a bore within a confined aquifer or water from other sources (ie dams, soaks or creeks) treated with a sterilant solution. Water from other sources will be treated with sodium hypochlorite solution with a concentration of 125 g/l of available chlorine.

5. A solution containing 1 L of hypochlorite solution per 1500 L of water (2 L of hypochlorite solution per 3000 L water tank or 335 ml of hypochlorite per 500 L water tank) is adequate to treat the water for use in washdown. The washdown water will be thoroughly mixed and left to stand for 24 hours prior to its use.
6. Dust adhering to the sides of vehicles does not need to be removed.
7. Gravel loading operations carried out under split phase conditions will include a physical barrier such as a log or earth berm or log separating the truck loading and gravel stockpile areas. Gravel cartage trucks will not enter the pit area. Gravel loading areas for split phase operations shall be quarantined from load areas and access tracks for dry phase operations. No plant or vehicles will be permitted to access vegetated areas outside of the pit boundaries.

Action / Responsibility: Main Roads Project Manager

2.6 Pit Clearing

It is expected that vegetation clearing, stockpiling and mulching will take place prior to the commencement of gravel extraction. The 6.65 ha of the pit area will be cleared in two stages as shown in Figure 2. This area will provide a suitable operating environment for pit operations including, gravel stockpile and topsoil stockpiles, and allow for rehabilitation works to take place soon after the completion of gravel crushing.

Action / Responsibility: Main Roads Project Manager

All mulched cleared vegetation and topsoil will be kept within the pit area.

Action / Responsibility: Main Roads Project Manager

During clearing, timber debris will be pushed away from the boundary and towards the centre of the pit using a bulldozer equipped with a tree bar and root rake.

Action / Responsibility: Main Roads Project Manager



2.7 Gravel Crushing and Topsoil Management

The Shire of Jerramungup proposes to excavate approximately 15 000m³ of gravel from Shire Pit 9. All gravel winning and stockpiling operations will be conducted under the conditions outlined in the Dieback Management detailed at Section 2.5.

Action / Responsibility: Main Roads Project Manager

Topsoil within the pit area will be stripped to a nominal depth of 100 mm and stockpiled in windrows up to 2 m in height. Topsoil heaps will not be compacted or allowed to become saturated by water ponding.

Action / Responsibility: Main Roads Project Manager

Any overburden not incorporated into the gravel will be stockpiled for use as road fill or respread as part of the pit rehabilitation.

Action / Responsibility: Main Roads Project Manager

At completion of the gravel winning and stockpiling the excavated pit area will be rehabilitated as detailed at Section 2.14.

Action / Responsibility: Main Roads Project Manager

2.8 Pit Drainage

The pit area is to be free draining and will not require a detention basin.

2.9 Fire Management

During vegetation clearing and mulching and gravel extraction operations, the following fire management conditions will be complied with:

- ▶ All machinery to be shut down during periods of extreme fire hazard as advised by the Chief Fire Control Officer from the Shire of Jerramungup.
- ▶ The provision of a portable fire fighting unit at all times. A minimum standard being a 450 litre tank with a petrol driven water pump connected to a 20m hose with a nozzle attached.
- ▶ All machinery to be fitted with fire extinguishers.
- ▶ A loader equipped with forks with the additional capacity to cut firebreaks will be available on-site at all times.

Action / Responsibility: Main Roads Project Manager



No fires will be permitted in the pit area during gravel extractions operations.

Action / Responsibility: *Main Roads Project Manager*

2.10 Pets and Firearms

No firearms and / or pets will be permitted on the site during the development, operation and / or rehabilitation of the site.

Action / Responsibility: *Main Roads Project Manager*

2.11 Fuel and Chemical Storage

If possible, on-site fuel and chemical storage will be avoided. Where on-site storage of flammable and combustible liquids, such as hydrocarbons, exceeds 250 litres they will be stored in a bunded area in accordance with Australian Standard 1940-2004: *The storage and handling of flammable and combustible liquids*.

Action / Responsibility: *Main Roads Project Manager*

Any fuel or chemical spills will be cleaned up immediately and any contaminated soils will be treated and disposed of in an appropriate manner.

Action / Responsibility: *Main Roads Project Manager*

DEC will be advised of any fuel or chemical spills as soon as practicable after they occur.

Action / Responsibility: *Main Roads Project Manager*

2.12 Rubbish Disposal

Domestic site rubbish will not be disposed of by burning. All domestic rubbish will be disposed of at a waste disposal site approved by the Shire of Jerramungup.

Action / Responsibility: *Main Roads Project Manager*

2.13 Gravel Cartage

Stockpiled gravel will be trucked from the pit area during road upgrading works.

Haulage trucks will enter the pit via the sheeted access track and turn-around where trucks will be loaded with stockpiled gravel. The loading area will be located within the pit area and restricted to a 10 m wide section adjacent to the pit access track / truck turn-around.



Action / Responsibility: Main Roads Project Manager

Gravel cartage will be conducted under dry soil conditions.. Should rainfall create wet soil conditions during pit operations gravel loading operations will be carried out under split phase conditions with a physical barrier such as a log or earth berm separating the loading and stockpile areas.. Split phase operations and the transitioning from split phase to dry phase operations shall be undertake in accordance with section 2.5.

Action / Responsibility: Main Roads Project Manager

2.14 Pit Rehabilitation

At the completion of gravel extraction activities, Shire Pit 9 will be rehabilitated as described below.

It should be recognised that the stockpile storage and truck loading area will not be rehabilitated until the stockpiled gravel has been removed. To ensure the later rehabilitation of the storage and loading area, some overburden and topsoil in stockpiles will be retained.

Action / Responsibility: Main Roads Project Manager

2.14.1 Earthworks – Gravel Pit Area

At the completion of gravel extraction and stockpiling operations, the pit area will be rehabilitated as described below:

- 1 Pit walls will be battered to a slope no more than 1 in 4 by pushing up material from the pit floor.
- 2 The pit floor will be shaped with a minimum 1 in 100 fall to avoid water ponding with any drainage directed downslope to the detention basins.
- 3 The pit floor and wall (batters) will be ripped during summer at 1 m spacings across the contour to a depth of at least 800 mm.
4. The pit area will be shaped to conform and blend into the adjacent landform as far as practical.
- 5 Topsoil and any overburden will be evenly respread over the pit area leaving a rough surface.
6. Any rock exposed during pit ripping will be used to construct fauna habitat within the pit area.

Action / Responsibility: Main Roads Project Manager

At the completion of gravel carting, the stockpile storage area and truck loading area will be rehabilitated as described above.

Action / Responsibility: Main Roads Project Manager



2.14.2 Revegetation of Pit Area

Revegetation will occur as the gravel extraction and carting is completed. As they become available, disturbed areas will be revegetated as described below:

- 1 Topsoil piles will be spread evenly across the ripped area.
- 2 Sufficient topsoil will be withheld to provide coverage of stockpile sites and access tracks due for later rehabilitation.
- 3 Seeding if required, at the direction of the Main Roads Environmental Manager, will be conducted at the break of the season.
- 4 All species planted will be locally occurring indigenous species sourced from within the provenance.

At this stage it is understood that the Shire of Jerramungup will carry out the seeding, planting and monitoring of the site.

Action / Responsibility: Main Roads Project Manager

2.15 Monitoring of Pit Management

The Shire of Jerramungup is responsible for development, operation and rehabilitation of Shire Pit 9. The management measures detailed in this Pit Management Plan will be followed during the development, operation and rehabilitation of the pit, and during gravel cartage operations.

Action / Responsibility: Main Roads Project Manager

The Shire of Jerramungup's Construction Supervisor will be provided with a copy of the Pit Management Plan and made aware of his responsibilities detailed in this plan.

Action / Responsibility: Main Roads Project Manager

The Shire of Jerramungup's Superintendent for the gravel extraction operations will be responsible for pit management and monitor their compliance by the crushing contractor.

Action / Responsibility: Main Roads Project Manager



3. References

GHD (2010a). Flora and Fauna Survey Report – Fitzgerald River National Park Road Upgrade. Unpublished Report. Prepared on Behalf of Main Roads Albany. October 2010.

GHD (2010b), Shire Pit 9 – Preliminary Environmental Impact Assessment, Unpublished Report, Prepared on Behalf of Main Roads Albany, December 2010

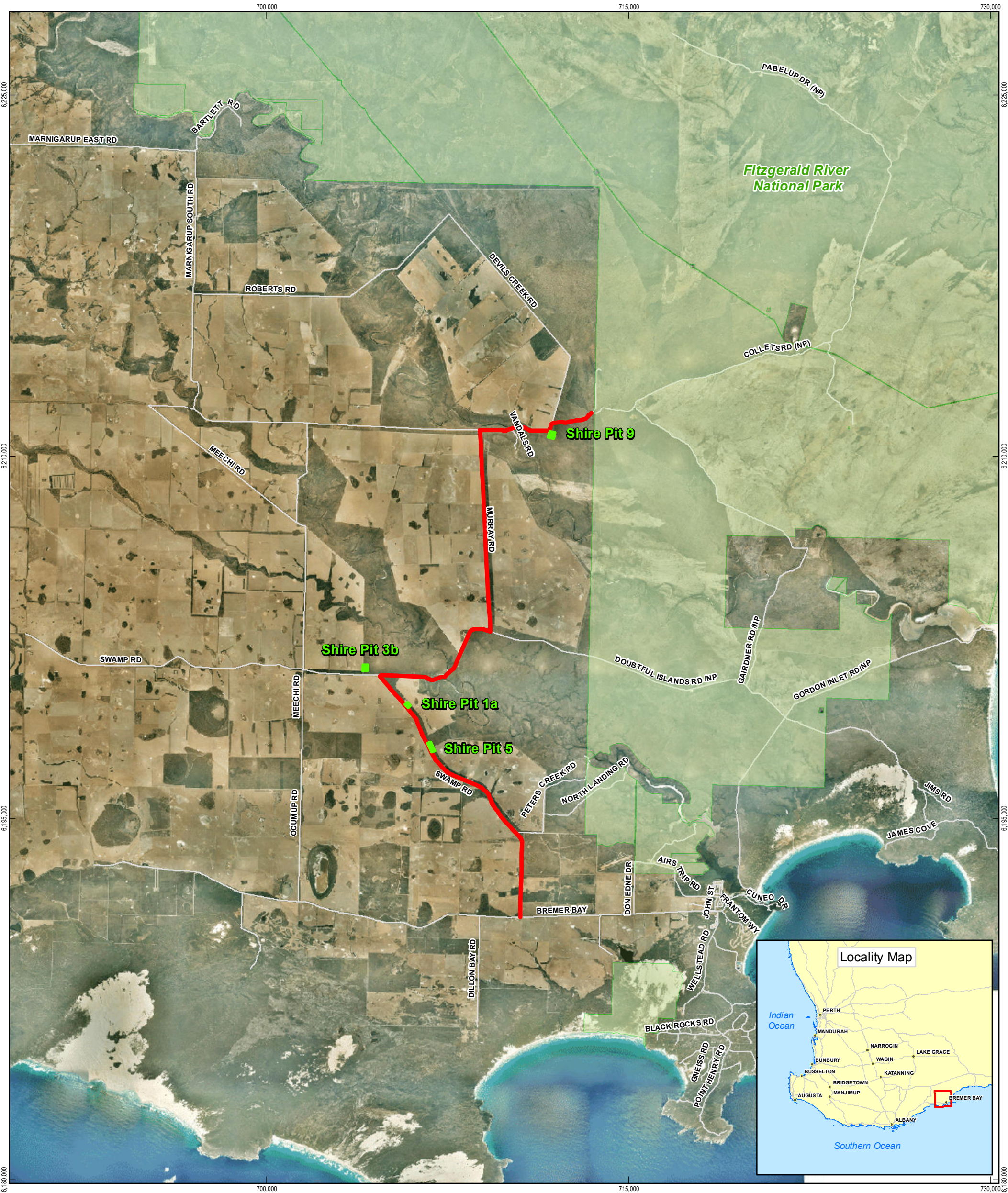
Goode, B (2010) Ethnographical survey of Swamp Road Shire Gravel Pits 1a, 3b and 9. Unpublished Report. Prepared on Behalf of Main Roads Albany.

Guilfoyle, D. (2010) Archaeological survey of Swamp Road Shire Gravel Pits 1a, 3b and 9. Unpublished Report. Prepared on Behalf of Main Roads Albany.

Standards Australia. (2004) The storage and handling of flammable and combustible liquids AS 1940-2004. Standards Association Australia. Homebush NSW.

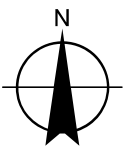
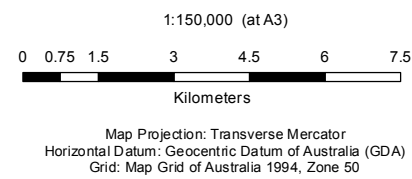


Figures



LEGEND

- Swamp Road Upgrade
- DEC Estate
- Shire Pits 1a, 3b, 5 & 9

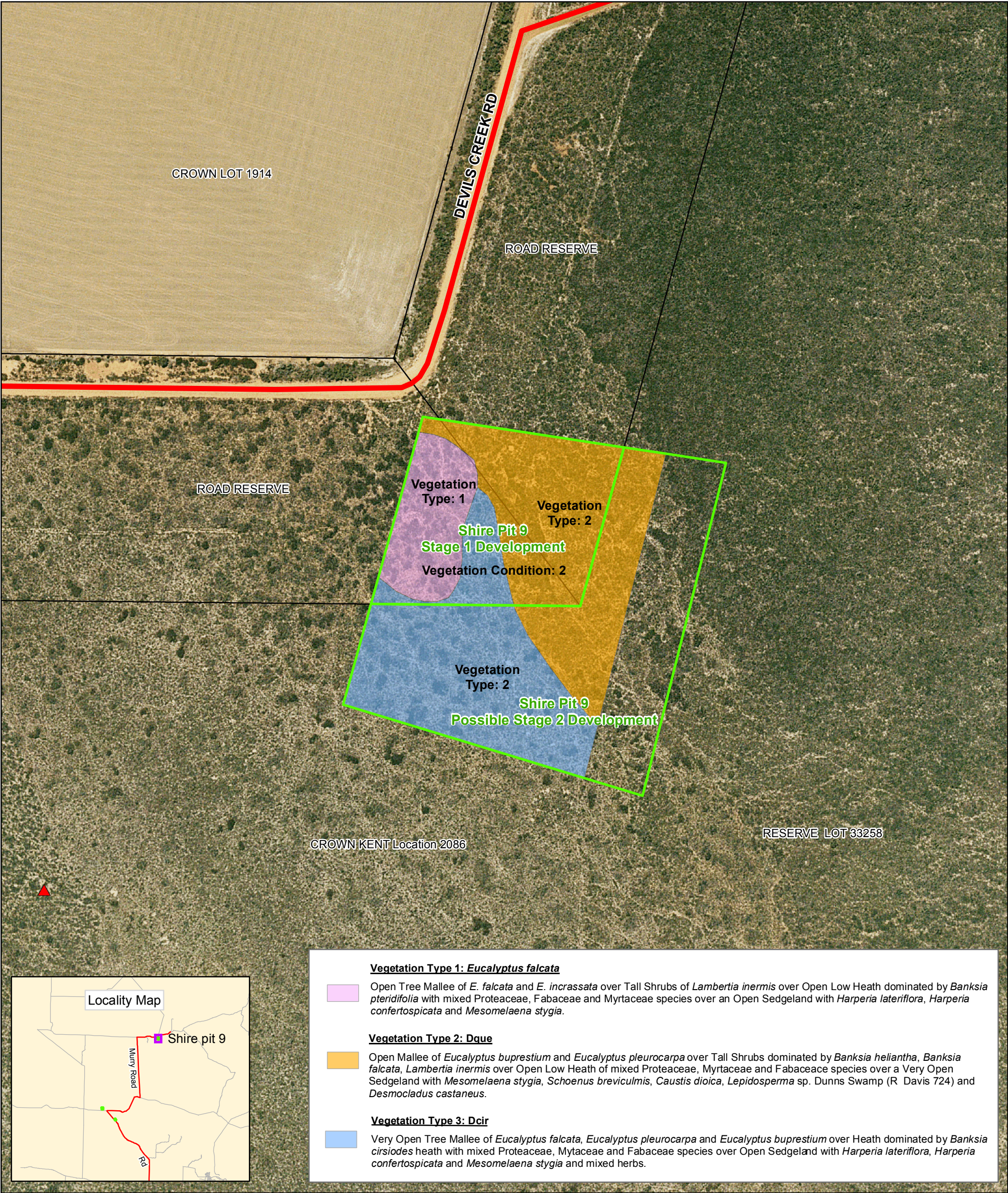


Main Roads WA - ETS
Fitzgerald River National Park
– Permits and Approvals

Job Number 61-26556
Revision 0
Date 18 JAN 2011

Locality Map

Figure 1



LEGEND

▲ (R) Declared Rare Flora - Extant Taxa

Swamp Road Upgrade

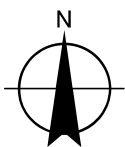
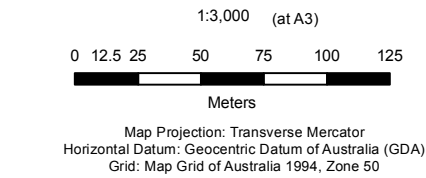
Shire Pits 9

Cadastral Boundary

The Bushland Condition: 2 - Excellent

Clearing Area Stage 1 = 2.43 ha

Clearing Area Stage 2 = 4.22 ha



Main Roads WA - ETS
Fitzgerald River National Park
– Permits and Approvals

Job Number 61-26414
Revision 0
Date 09 DEC 2010

Shire Pit 9 PMP
Proposed Clearing Area

Figure 2



Appendix A

Summary of Environmental Management Requirements



Table 1 Summary of Environmental Management Requirements

Issue	Management Measure	Responsibility
Pit Boundaries	Prior to the commencement of any works in the pit area the pit boundaries will be marked to ensure that they are clearly visible from within the site.	Main Roads Project Manager
Aboriginal Heritage	As the land tenure for Stage 2 development is vacant crown land access is subject to the Native Title Act 1993. Negotiations should be conducted with The South West Aboriginal Land and Sea Council.	Main Roads Project Manager
Gravel Pit Access	Access to Pit 9 will be via a new access track. The vegetation removal will be kept to the minimum necessary for the safe use of the track and be conducted under the dieback hygiene conditions detailed at Section 2.5 below.	Main Roads Project Manager
	Access track development will be carried out under dieback hygiene conditions detailed in Section 2.5 below	Main Roads Project Manager
	Truck turn-around loops will be developed within the pit area.	Main Roads Project Manager



Issue	Management Measure	Responsibility
Dieback Management	<p>All activities associated with the pit clearing, vegetation mulching, gravel crushing, stockpiling, cartage operations and rehabilitation works will be conducted under the following dieback hygiene conditions:</p> <ol style="list-style-type: none">1 All contractors and site employees will be advised of the <i>Phytophthora cinnamomi</i> management measures.2 Signs indicating that the pit site is dieback free and that vehicles are to be 'Clean on Entry' will be installed on the pit access track adjacent to the intersection of Swamp Road.3 Operations and gravel cartage from the pit will be conducted under dry soil conditions. Dry soil conditions are defined as when soil does not clod, adhere or accumulate on plant or vehicles. Should rainfall create wet soil conditions during pit operations split phase operations will be introduced. If there is any rainfall event of more than 7.5mm works will be suspended. When transitioning from split phase operations to dry phase operations, the site Environmental Officer shall certify that conditions have returned to allow dry phase operations and all plant that was used during split phase operations shall be cleaned and recorded as cleaned by the Site Environmental Officer. Split phase loading areas shall be barriered off to prevent access during dry phase operations.	Main Roads Project Manager



Issue	Management Measure	Responsibility
Dieback Management	<p>4 The gravel crushing plant and associated machinery will be cleaned free of all soil and plant material prior to arrival and prior to departing the site. Clean down will comprise of:</p> <p>(a) The use of a brush and / or compressed air to remove clods of soil and / or soil water slurry. A metal bar or spade will be used to remove compacted soil where necessary.</p> <p>Alternately,</p> <p>(b) Water used for washdown and dust suppression will be sourced from a domestic mains water supply, from a bore within a confined aquifer or water from other sources (ie dams, soaks or creeks) treated with a sterilant solution. Water from other sources will be treated with sodium hypochlorite solution with a concentration of 125 g/l of available chlorine.</p>	Main Roads Project Manager
	<p>5 A solution containing 1 L of hypochlorite solution per 1500 L of water (2 L of hypochlorite solution per 3000 L water tank or 335 ml of hypochlorite per 500 L water tank) is adequate to treat the water for use in washdown. The washdown water will be thoroughly mixed and left to stand for 24 hours prior to its use.</p>	
	<p>6 Dust adhering to the sides of vehicles does not need to be removed.</p>	
	<p>8 Gravel loading operations carried out under split phase conditions will include a physical barrier such as a log or earth berm or log separating the truck loading and gravel stockpile areas. Gravel cartage trucks will not enter the pit area. Gravel loading areas for split phase operations shall be quarantined from load areas and access tracks for dry phase operations.</p>	
	<p>9 No plant or vehicles will be permitted to access vegetated areas outside of the pit boundaries.</p>	
Pit Clearing	<p>The 6.65 ha of the pit will be cleared and the pit developed in two stages, the pit area is shown in Figure 2.</p>	Main Roads Project Manager



Issue	Management Measure	Responsibility
Pit Clearing	All mulched vegetation and topsoil will be kept within the pit area.	Main Roads Project Manager
	During clearing, timber debris will be pushed away from the boundary and towards the centre of the pit using a bulldozer equipped with a tree bar and root rake.	Main Roads Project Manager
Gravel Crushing and Topsoil management	The Shire of Jerramungup proposes to excavate approximately 15 000m ³ of gravel from Shire Pit 9. All gravel winning and stockpiling operations will be conducted under the conditions outlined in the Dieback Management detailed in the Pit Management Plan.	Main Roads Project Manager
	Topsoil within the pit area will be stripped to a nominal depth of 100 m and stockpiled in windrows up to 2m in height. Topsoil heaps will not be compacted or allowed to become saturated by water ponding.	Main Roads Project Manager
	Any overburden not incorporated into the gravel will be stockpiled for use as road fill or respread as part of the pit rehabilitation.	Main Roads Project Manager
	At completion of the gravel winning and stockpiling the excavated pit area will be rehabilitated as detailed in the Pit Management Plan.	Main Roads Project Manager
Pit Drainage	The pit area is to be free draining and will not require a detention basin.	Main Roads Project Manager
Fire Management	During vegetation clearing and mulching and gravel extraction operations the following fire management conditions will be complied with:	Main Roads Project Manager
	All machinery to be shut down during periods of extreme fire hazard as advised by DEC	
	1 The provision of a portable fire fighting unit. A minimum standard being a 450 litre tank with a petrol driven water pump connected to a 20m hose with a nozzle attached	
	2 All machinery to be fitted with fire extinguishers	
	3 A loader equipped with forks with the additional capacity to cut firebreaks will be available on-site	



Issue	Management Measure	Responsibility
Fire Management	No fires will be permitted in the pit area during gravel crushing operations.	Main Roads Project Manager
Pets and Firearms	No firearms and / or pets will be permitted on the site during the development, operation and / or rehabilitation of the site	Main Roads Project Manager
Fuel and Chemical Storage	If possible on-site fuel and chemical storage will be avoided. Where on-site storage of flammable and combustible liquids, such hydrocarbons, exceeds 250 litres they will be stored in a bunded area in accordance with Australian Standard 1940-2004: <i>The storage and handling of flammable and combustible liquids</i> .	Main Roads Project Manager
	Any fuel or chemical spills will be cleaned up immediately and any contaminated soils will be treated and disposed of in an appropriate manner as required.	Main Roads Project Manager
	DEC will be advised of any fuel or chemical spills as soon as practicable after they occur.	Main Roads Project Manager
Rubbish Disposal	Domestic site rubbish will not be disposed of by burning. All domestic rubbish will be disposed of at a waste disposal site approved by the Shire of Jerramungup	Main Roads Project Manager
Gravel Cartage	Haulage trucks will enter the pit via the sheeted access track and turn-around where trucks will be loaded with stockpiled gravel. The loading area will be located within the pit area and restricted to a 10 m wide section adjacent to the pit access track / truck turn-around.	Main Roads Project Manager
	Gravel cartage will be conducted under dry soil conditions.. Should rainfall create wet soil conditions during pit operations gravel loading operations will be carried out under split phase conditions with a physical barrier such as a log or earth berm separating the loading and stockpile areas.. Split phase operations and the transitioning from split phase to dry phase operations shall be undertake in accordance with section 2.5.	Main Roads Project Manager



Issue	Management Measure	Responsibility
Pit Rehabilitation	<p>At the completion of gravel extraction and stockpiling operations Shire Pit 9 will be rehabilitated.</p> <p>It should be recognised that the stockpile storage and truck loading area will remain un-rehabilitated until the stockpiled gravel has been removed. This will require the retention of some overburden and topsoil in stockpiles for later rehabilitation works.</p>	Main Roads Project Manager
Pit Rehabilitation – Earthworks Gravel Pit Area	<p>At the completion of gravel extraction and stockpiling operations the pit area will be rehabilitated as described below:</p> <ol style="list-style-type: none">1 Pit walls will be battered to a slope no more than 1 in 4 by pushing up material from the pit floor.2 The pit floor will be shaped with a minimum 1 in 100 fall to avoid water ponding with any drainage directed downslope to the detention basins.3 The pit floor and wall (batters) will be ripped during summer at 1 m spacings across the contour to a depth of at least 800 mm.4. The pit area will be shaped to conform and blend into the adjacent landform as far as practical.5 Topsoil and any overburden will be evenly respread over the pit area leaving a rough surface.6. Any rock exposed during pit ripping will be used to construct fauna habitat within the pit area.	Main Roads Project Manager



Issue	Management Measure	Responsibility
Revegetation of Pit Area	Revegetation will occur as the gravel extraction and carting is completed. Disturbed areas will be revegetated as described below:	Main Roads Project Manager
	1 Topsoil piles will be spread evenly across the ripped area.	
	2 Sufficient topsoil will be withheld to provide coverage of stockpile sites and access tracks due for later rehabilitation.	
	3 Seeding if required, at the direction of the Main Roads Environmental Manager, will be conducted at the break of the season.	
	4 All species planted will be locally occurring indigenous species sourced from within the provenance.	
	At this stage it is understood that the Shire of Jerramungup will carry out the seeding, planting and monitoring of the site.	
Monitoring of Pit Management	The Shire of Jerramungup is responsible for development, operation and rehabilitation of the Pit 9. The management measures detailed in this Pit Management Plan will be followed during the development, operation and rehabilitation of the gravel pit, and during gravel cartage operations.	Main Roads Project Manager
	The Shire of Jerramungup's Construction Supervisor will be provided with a copy of the Pit Management Plan and made aware of his responsibilities detailed in this plan.	Main Roads Project Manager
	The Shire of Jerramungup's Superintendent for the gravel extraction operations will be responsible for pit management and monitor their compliance by the crushing contractor	Main Roads Project Manager



GHD

1st Floor 10 Victoria Street

Bunbury WA 6230

T: 08 9721 0700 F: 08 9721 0777 E: bunmail@ghd.com.au

© GHD 2010

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
Draft	G. Johnstone / C. Lane	N. McCarthy	<i>N. McCarthy</i>	F. Hannon	<i>F. Hannon</i>	3/12/10
Final	G. Johnstone / C. Lane	F. Hannon	<i>F. Hannon</i>	F. Hannon	<i>F. Hannon</i>	<i>17.12.2010</i>