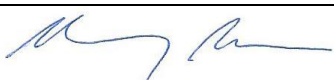




Offset Revegetation Plan for Clearing Permit CPS 7534 / 1
on Goomalling / Meckering Rd – from SLK 0.00 – 8.00



By : Rod Munns

Revision	Prepared By	Signature	Date Issued
0	Rod Munns		23 rd November 2017
1	Rod Munns		26 th November 2018

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1. Introduction

The Shire of Goomalling submitted a clearing permit to the Department of Environmental Regulation (DER) on the 17th March 2017, to clear 2.55 Ha of native verge vegetation on the Goomalling / Meckering Rd from SLK 0.0 to 8.00. The clearing is required to widen the road carriageway as part of the road upgrade and reconstruction project, to provide a safer carriageway width to cater for the larger combination vehicles utilising this road. Prior to the application process, the Shire of Goomalling agreed to compromise the road design and reduce the required clearance width from 18m (desired) to 14m width. The native vegetation to be cleared is mainly Jam trees, some York Gum trees, and to a far lesser extent, Salmon Gum trees.

The DER have replied to the Clearing Permit application and advised that this clearing will have significant residual impacts to the environment, and that an offset will be required to mitigate these impacts. The DER have advised that the offset calculator has revealed either of the following offsets would be adequate to mitigate the impacts:

- 1) Provide a conservation covenant over an approximate 5.5 Ha area of native vegetation within relative close proximity to the application area, and in good condition, or
- 2) Revegetate an approximate 3.2 Ha area with vegetation from a completely degraded condition to good condition.

The Shire of Goomalling is proposing to revegetate a 3.26 Ha area within a Shire vested Gravel Reserve alongside Patterson Rd, within a 2km distance from the end of the affected clearing permit area, as the suggested offset.

2. Site Background Information

The Shire vested Gravel Supply Reserve (# 4237) situated on the western side of Patterson Rd is located 1.7km south south-west of the Patterson and Hulongine Rd intersection with the Goomalling / Meckering Rd. This reserve is 4.04 Ha in area and over three quarters of the gravel pit area has been mined out of gravel for road construction purposes by the Shire of Goomalling. Some spoil material including topsoil from road verges has been stockpiled back into this gravel pit over a number of years. It is ideally situated for revegetation and is located close to the affected application area.

The gravel pit reserve is located within 150m from the crest and is situated within the highest 95% of the surrounding land area. The natural surface slope is from North North-East to South South-West with a slope of 6.07 %. This natural surface slope is consistent across the site and subsequently surface water can drain naturally off the site. The insitu soil is predominantly gravel. However, the remnant native vegetation and area surrounding this gravelly ridge is predominantly Jam & York Gum country with remnant native vegetation species typical on this type of country. The same remnant native vegetation is existent on the gravel reserve revegetation site and adjacent control sites located on this gravelly ridge.

There are some Jam and York Gum trees, and Rock Sheoak shrubs growing in the southern triangular corner of the gravel pit reserve – approximately 40 trees / shrubs in total – in a 0.17 Ha area.

It is proposed to revegetate the 3.26 Ha area in the south western portion of this reserve where the gravel has been mined out, utilising remnant native vegetation

species growing within the control sites adjacent along the Patterson Rd verge. See Appendices 1 and 2 showing the location plan and offset plan for this revegetation area, and control site quadrat locations.

3. Control Sites

Five (5) control sites were identified along the Patterson Rd verge adjacent to (within 150m of the extents) the Gravel Pit revegetation site. 10m x 10m quadrats were set up at each of these control points to identify remnant native vegetation species composition and structure, condition, density and weed cover. Photographs were taken at each control site and are shown in Appendix 4 attached to this document. The results are shown in the tables below for each control site.

Control Site #1 Native Vegetation Assessment – Patterson Rd at GPS 485321E, 6526075N					
Species Identified	No. of Plants in quadrat	% of total plants in quadrat	Density of species	Structure	Condition
Acacia Acuminata (Jam Tree)	5	100 %	Low	30% Overstorey 70% Midstorey	Good
Weed Cover / Density					Nil

Control Site #2 Native Vegetation Assessment – Patterson Rd at GPS 485292E, 6525995N					
Species Identified	No. of Plants in quadrat	% of total plants in quadrat	Density of species	Structure	Condition
Acacia Acuminata (Jam Tree)	13	100 %	Medium	30% Overstorey 70% Midstorey	Good
Weed Cover / Density					Nil

Control Site #3 Native Vegetation Assessment – Patterson Rd at GPS 485248E, 6525844N					
Species Identified	No. of Plants in quadrat	% of total plants in quadrat	Density of species	Structure	Condition
Eucalyptus Loxophleba (York Gum Tree)	1	0.8 %	Medium	Overstorey	Good
Atriplex Semibaccatta (Creeping Saltbush shrub)	89	73.0 %	High	Understorey	Average
Enchylaena Tomentosa (Ruby Saltbush shrub)	32	26.2 %	Medium	Understorey	Good
Weed Cover / Density					Medium

Control Site #4 Native Vegetation Assessment – Patterson Rd at GPS 485401E, 6526238N					
Species Identified	No. of Plants in quadrat	% of total plants in quadrat	Density of species	Structure	Condition
Acacia Acuminata (Jam Tree)	4	50.0 %	Low	60% Overstorey 40% Midstorey	Average
Allocasuarina Huegeliana (Rock Sheek Shrub)	1	12.5 %	Low	Midstorey	Average
Atriplex Semibaccatta (Creeping Saltbush shrub)	3	37.5 %	Low	Understorey	Good
Weed Cover / Density					Medium

Control Site #5 Native Vegetation Assessment – Patterson Rd at GPS 485423E, 6526330N					
Species Identified	No. of Plants in quadrat	% of total plants in quadrat	Density of species	Structure	Condition
Acacia Acuminata (Jam Tree)	6	100.0 %	Low	70% Overstorey 30% Midstorey	Good
Weed Cover / Density					Medium

On average across the 5 x control sites, the identified native vegetation and their total approximate foliage areas and percentages, and structures are summarised below:

Summary of Native Species and Structure Identified in 5 x Control Sites					
Species Identified	Total No. of Plants in 5 quadrats	Approx. % of total foliage area	Average Density of species	Average Structure	Average Condition
Acacia Acuminata (Jam Tree)	28	80.0 %	Low	43% Overstorey 57% Midstorey	Good
Atriplex Semibaccatta (Creeping Saltbush shrub)	92	6.0 %	Low	Understorey	Average
Enchylaena Tomentosa (Ruby Saltbush shrub)	32	2.0 %	Low	Understorey	Good
Eucalyptus Loxophleba (York Gum Tree)	1	10.0 %	Low	Overstorey	Good
Allocasuarina Huegeliana (Rock Sheoak Shrub)	1	2.0 %	Low	Midstorey	Average
Average Weed Cover / Density					Low
Average Structure				Overstorey (O)	44.4 %
				Midstorey (M)	47.6 %
				Understorey (U)	8.0 %

There are also 2 x *Acacia Lasiocalyx* (shaggy wattle) shrubs growing on the revegetation site, along with 2 x *Allocasuarina Huegeliana* (Rock Sheoak) shrubs, 8 x *Eucalyptus Loxophleba* (York Gum) trees, and 28 x *Acacia Acuminata* (Jam) trees. These are located in the 0.17 Ha triangular area in the southern corner of the reserve.

4. Completion Criteria

Based on the assessment of the remnant vegetation on the five control sites and some vegetation on the revegetation site, the following remnant native vegetation species will be planted on the site to the targets stated:

Species	Common Name	% to be planted	Structure
Acacia Acuminata	Jam (Tree / Shrub)	40	25% Overstorey 75% Midstorey
Eucalyptus Loxophleba	York Gum (Tree)	20	Overstorey
Atriplex Semibaccatta	Creeping Saltbush (Shrub)	5	Understorey
Enchylaena Tomentosa	Ruby Saltbush (Shrub)	5	Understorey
Melaleuca Cordata	Pom Pom (Shrub)	4	Understorey
Maireana brevifolia	Bluebush (Shrub)	4	Understorey
At. vesicaria	Gimlet Saltbush (Shrub)	2	Understorey
Allocasuarina Huegeliana	Rock Sheoak (Shrub)	5	Midstorey
Acacia Lasiocalyx	Shaggy Wattle (Shrub)	5	Midstorey
Eucalyptus Salmonophloia	Salmon Gum (Tree)	10	Overstorey
Total		100	
Target Species Richness (%)		167% (Note : 6 species have been	

	identified in the 5 x control sites and onsite, and 10 species will be planted to provide variation. The additional species (not located onsite and in the control sites) is located locally and in close proximity to the site.	
Target Planting Rate (Stems / Ha)	1200 stems / Ha	
Target Success Rate (%)	75 %	
Target Structure %	Overstorey (O)	40%
	Midstorey (M)	40%
	Understorey (U)	20%
Target Weed Cover / Density	<= 20%	

The additional species that have been included for planting in the revegetation site, are:

- Eucalyptus Salmonophloia (Salmon Gum),
- Melaleuca cordata (Pom Pom),
- Maireana brevifolia (Bluebush),
- At. Vesicaria (Gimlet Saltbush),

which are all located locally and in close proximity to the site.

5 Site Preparation & Methodology

The Shire of Goomalling's Works and Parks and Gardens crew will revegetate the proposed site. They have revegetated similar sites previously with success. One of the latest revegetation sites is located at the intersection of the Northam / Pithara Rd and Patterson Rd, where predominantly York Gums, Salmon Gums and Jam trees were planted, and which has a survival rate well above 75% and is in good condition.

5.1 Site Preparation

The stockpiles of spoil (from roads verges) and topsoil located within the used gravel pit area will be spread evenly over the site and deep ripped. Pre-planting weed control will be carried out across the site (two applications may be required – early winter and just prior to planting).

5.2 Planting Technique

The tubestock seedlings will be planted with a one-pass operation involving a mechanical tree planter (towed by tractor) that is able to scalp, rip and plant in one motion. This will allow minimal disruption to the soil while removing any direct competition against the seedlings. Works crew members will follow the tree planter and adjust seedlings as and if required. Planting will be targeted for July to allow for optimal moisture and follow up rains, ensuring the best possible survival rate.

5.3 Seedlings

The seedlings to be planted will be sourced from local commercial nurseries with the seed genetic providence as local as possible. These nurseries are proficient at growing seedlings that establish well in our area. The target planting rates will be as stated in section 4 above and areas that fall below the target success rate will be replanted the following winter.

5.4 Weed Control

The revegetation areas will be monitored for weed burden and chemical weed control will be carried out as required to ensure that a target weed density of less than or equal to 20% is met.

5.5 Animal Control

Rabbit numbers will be monitored at the sites and if required they will be controlled with a 1080 baiting program.

6 Monitoring

Four (4) photo monitoring points will be established and will be used as part of the monitoring process over the ten years following planting. These locations are shown on the Offset Plan in Appendix 2. Five (5) by 10m long x 10m wide Monitoring Quadrats will be established across the site where shown on the Offset Plan in Appendix 2. These monitoring quadrats will allow density values to be accurately calculated and re-planting will be conducted in those areas not meeting the Target Success Rate. Monitoring will be conducted by the Shire's Works Supervisor.

7 Timeline for Revegetation Works

Works on this revegetation project will commence at the beginning of 2018 with site preparation and planting in July, as shown in the table below.

Year	Preparation	Seedling Planting	Replanting & Weed Control	Monitoring
2018	February – Spread spoil / topsoil and deep rip site. May &/or June - Spray Weeds (may require 2 spray applications).	July		
2019			If required in winter	Yes
2020			If required in winter	Yes
2021			If required in winter	Yes
2022			If required in winter	Yes
2023			If required in winter	Yes
2024			If required in winter	Yes
2025			If required in winter	Yes
2026			If required in winter	Yes
2027			If required in winter	Yes

8 Security of Revegetation Offset Site

The Shire of Goomalling will either change the vesting purpose of the proposed revegetation offset site from "Gravel Supply" to "Conservation", or place a Conservation Covenant over the proposed revegetation offsite site.

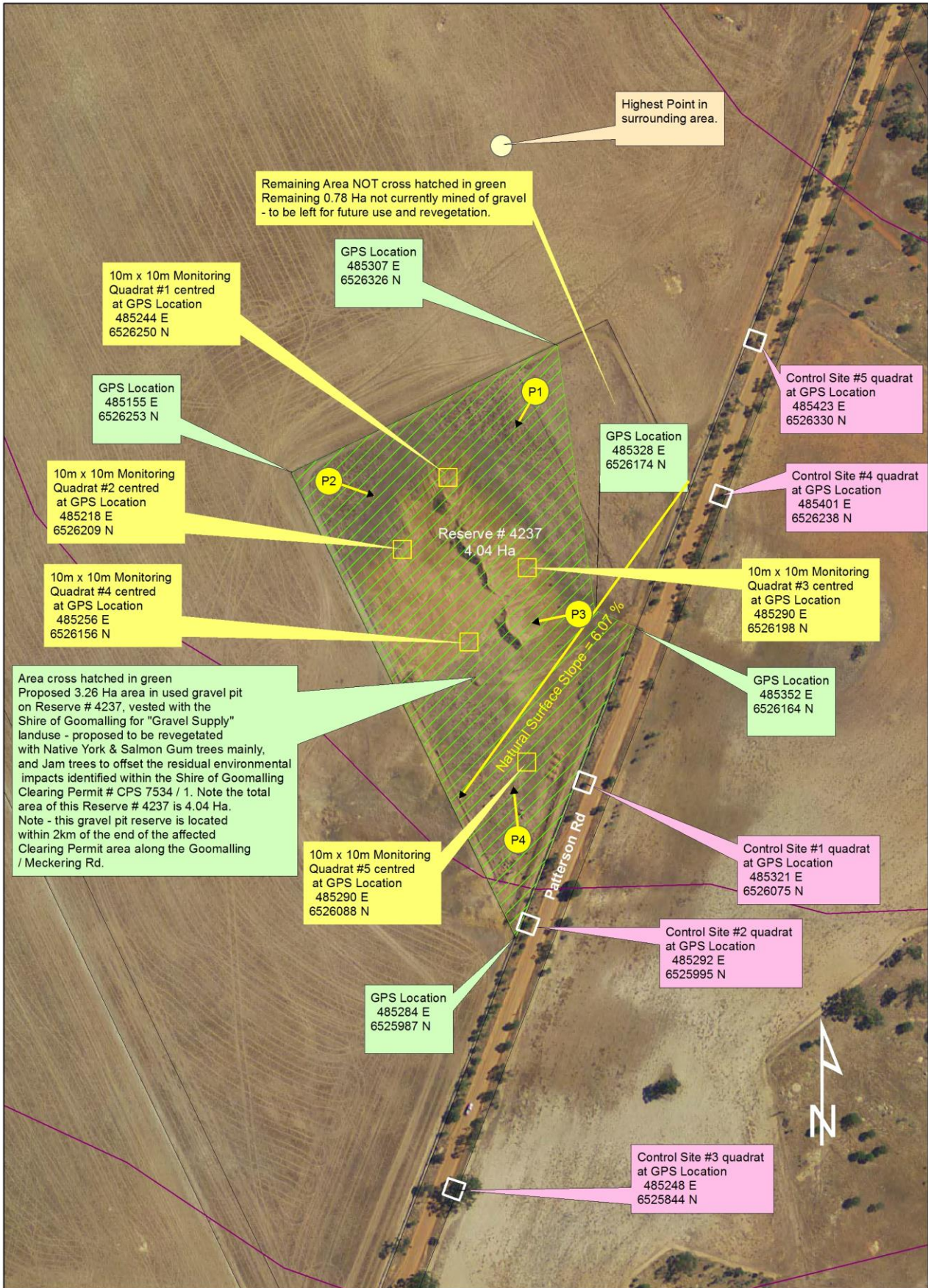
Appendix 1 – Offset Site Location Plan



Location Plan for Revegetation Offset Proposal Area for affected Clearing Area for the Shire of Goomalling Clearing Permit CPS 7534 / 1.

0 0.075 0.15 0.3 Kilometers

Appendix 2 – Offset Plan



Revegetation Offset Proposal Plan for the Shire of Goomalling Clearing Permit CPS 7534 / 1. 0 0.03 0.06 0.12 Kilometers

Appendix 3 – Photos of Offset Revegetation Site



Appendix 4 – Photos of Control Sites



Control Site #1 – Photo #1



Control Site #1 – Photo #2



Control Site #2 – Photo #1



Control Site #2 – Photo #2



Control Site #3 – Photo #1



Control Site #3 – Photo #2



Control Site #4 – Photo #1



Control Site #4 – Photo #2



Control Site #5 – Photo #1



Control Site #5 – Photo #2

Appendix 5 – Photos of Existing Native Vegetation Onsite



Appendix 6 - Offset Quantification Sheet

Project : Shire of Goomalling - Clearing Permit CPS 7534 / 1 - Offset Quantification Sheet									
Existing Environmental Impact	Mitigation			Significant Residual Impact	Offset				
	Avoid & Minimise	Rehabilitation Type	Likely Rehab Success		Type	Risk	Likely Offset Success	Time Lag	Offset Value
2.55 Ha of Native Vegetation was applied to be cleared, following the decision by the Shire of Goomalling to adopt a compromised road design with lesser required vegetation clearance width of 14m (from preferred 18m vegetation clearance width). The land is a Road Reserve vested with the Shire of Goomalling.	The Shire of Goomalling's preferred road design is for an 18m clearance zone which would require clearing 6m of verge vegetation at ground level. To minimise the clearing footprint, the Shire of Goomalling have agreed to a compromised, lesser standard road design which will require a clear zone with clearing footprint of 2m at ground level.	Onsite Rehabilitation is not possible, due to lack of sufficient area within the road reserve.	N/a	<p>The significant residual impact remains at 2.55 Ha due to the permanent loss of values impacted.</p> <p><u>Extent</u> 2.55 Ha</p> <p><u>Quality</u> Degraded to completely degraded</p> <p><u>Conservation Significance</u> As the application is at variance to principle e) - is remnant vegetation in an area that has been extensively cleared; and f) - is growing in, or in association with, an environment associated with a watercourse or wetland; there is a high conservation significance</p> <p><u>Land Tenure</u> N/a</p> <p><u>Time Scale</u> Permanent</p> <p>As per the significance framework, the residual impact is significant as the impacts are to remnant vegetation in an area that has been extensively cleared, and growing in or in association with, an environment associated with a watercourse or wetland.</p>	<p><u>Revegetation of a minimum 3.2 Ha area of degraded land area within affected Clearing Permit area.</u></p> <p>It is proposed to revegetate a 3.26 Ha area within the 4.04 Ha Gravel Pit Reserve # 4237 alongside Patterson Rd, vested with the Shire of Goomalling and located within 2km of the end of the affected Clearing Permit application area.</p>	There is a low risk to the offset site revegetation, as the site is vested with the Shire of Goomalling and monitoring and replanting of the revegetation will take place after establishment to ensure the environmental offset value is achieved.	<p><u>Can the values be defined and measured?</u> Yes</p> <p><u>Operator experience/Evidence?</u> The Shire of Goomalling have revegetated sites previously with success. The last site was at the intersection of Patterson Rd and the Northam / Pithara Rd in 2013.</p> <p><u>What is the type of vegetation being revegetated?</u> Jam Tree, York Gum, Salmon Gum, Shaggy Wattle, Rock Sheoak, Creeping Saltbush, Ruby Saltbush, Pom Pom, Bluebush and Gimlet Saltbush seedlings will be planted.</p> <p><u>Is there evidence the environmental values can be re-created (evidence of demonstrated success)?</u> Yes - the revegetation of the Patterson Rd & Northam / Pithara Rd intersection area located approx 7.1 kms south west of the revegetation site on similar soil in 2013 with York and Salmon Gum trees, and Jam Trees indicates the environmental values can be achieved with the revegetation of the proposed site.</p>	Although the revegetation will be completed by the end of winter 2018, there will be a time lag before the revegetated site reaches a suitable growth level where the impact value is offset (estimated at 10 years).	The offset value has been determined using the calculator. The 3.26 Ha of revegetation of the proposed gravel reserve site from its present degraded condition to a good condition is equivalent to the offset required.