Appendix H - Annual Biodiversity & Rehabilitation Management Report

ANNUAL BIODIVERSITY & REHABILITATION MANAGEMENT REPORT 2019

Prepared for Dixon Sand Pty Ltd

September 2019 V.1

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Annual Biodiversity

&

Rehabilitation Management

Report

2019

Dixon Sand Pty Ltd

This assessment has been prepared by

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September 2019 V.1

Date

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Abbreviations

Abbreviation	Description
BC Act	*Biodiversity Conservation Act 2016*
EEC	Endangered Ecological Community
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
HRBOA	Haerses Road Biodiveristy Offset Area
HTW	High Threat Weed
KPI	Key Performance Indicators
KTP	Key Threatening Process
LEP	Local Environmental Plan
Mod 4	Modification 4
NSW OEH	New South Wales Office of Environment and Heritage
NVC	Native Vegetation Corridor
ONR	Old Northern Road
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
THSC	The Hills Shire Council
VIS	Vegetation Information System

1 INTRODUCTION

This report presents the findings of the annual monitoring of the biodiversity value and rehabilitation effort within the Dixon Sand operation at Old Northern Road Maroota and the biodiversity value of the offset vegetation at Haerses Road Maroota.

1.1 BACKGROUND

Dixon Sand Pty Ltd operates a sand extraction and processing operation across 58.4 hectares on Lot 29 DP752025, Lot 196 DP752025, Lot 1 DP547255 and Lot 2 DP547255 Old Northern Road Maroota. The quarry operates in compliance to Development Consent 250-09-01 issued by the Land and Environment Court in 2004.

Several modifications have been made to the Development Consent, the most recent being described as Modification 5. The previous modification, known as Mod 4, involved the clearing of native vegetation for continued sand extraction resulting in consent conditions requiring the management of biodiversity values and impacts. Thus a Biodiversity Offset Strategy for the Old Northern Road quarry site was established which includes a Native Vegetation Corridor (NVC) and the Haerses Road Biodiversity Offset Area (HRBOA).

1.2 OBJECTIVES

The objectives of this Annual Biodiversity and Rehabilitation Management Report is to describe the current condition of the NVC and the HRBOA and to advise Dixon Sand on the appropriate management measures required to be implemented in order to meet the expectations of the Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (2018) prepared by Umwelt (Australia) Pty Ltd.

This report will:

- identify native flora and fauna species, populations and ecological communities known to or likely to occur within the NVC and HRBOA;
- describe the native vegetation and habitats within the NVC and HRBOA;
- describe the current condition of the threatened flora and its habitat found outside of the NVC at Old Northern Road;
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the NVC and HRBOA with reference to the Commonwealth *EPBC Act 1999* and the *NSW BC Act 2016*;
- recommend appropriate biodiversity and environmental management measures that should be implemented to reach criteria for monitoring success set by the Old Northern Road Quarry Biodiversity and Rehabilitation Management Plan (2018);
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

2 METHODOLOGY

2.1 SITE HISTORY

2.1.1 Old Northern Road Native Vegetation Corridor

The NVC on the Old Northern Road quarry site is 6.83 hectares, approximately 100m wide and 650m in length in an east-west direction. Approximately half the area of the NVC has been, or is currently, disturbed for sand extraction and areas dedicated as silt ponds. Approximately 0.8 hectares is currently under active rehabilitation as will be discussed further in this report.

The remaining vegetation within the NVC is disturbed and modified. Livestock grazing, timber removal and fruit orchards in the immediate and adjacent lands have contributed to the ongoing disturbance over many years within this area. As a result, exotic weed species are prolific and at times dominate the landscape. Farm dams have been dug which once provided irrigation to the fruit orchards and watered livestock. They now provide a water source for native and exotic species which occur in the immediate area.

Unsealed tracks are found throughout the NVC which currently provide easy access for vehicles or pedestrians.

2.1.2 Haerses Road Biodiversity Offset Area

The HRBOA is relatively undisturbed native vegetation which covers an area of 8.7 hectares. Four vegetation communities have been identified within the offset which includes habitat for threatened species known to occur in the area. Old vehicle tracks occur within the site although over time, with very little use, the tracks are now suitable for pedestrian access only.

2.1.3 Threatened flora habitat

An area to the west of the Old Northern Road NVC contains threatened flora habitat which has previously been identified and monitored. This area has had very little disturbance due to its location and unsuitability for grazing, farming or logging. A haul road had previously been constructed adjacent to the site however this road is no longer in use and most likely had very minimal impact upon the threatened flora habitat.

2.2 FIELD SURVEY

Botanical surveys of the study area were conducted over several days spread throughout August and September 2019. Fixed quadrat surveys were set up with long edges running in a west-east direction. Quadrat locations in the HRBOA were each marked with a permanent steel post and a yellow cap in the centre location along the western edge of the quadrat. The Old Northern Road NVC quadrats were marked with flagging tape given that some vegetation within the NVC is still subject to disturbance by sand extraction.

Each quadrat was 20m x 50m which included a subplot of 20m x 20m and 5 line plots of 1m x 1m. A random meander was conducted through most other areas of native vegetation within

the study area, to search for threatened flora species, and to record information on habitat condition.

All flora species recorded are listed in Appendix A, B and C of this report.

Vegetation communities were identified and described with reference to the vegetation maps developed by THSC, the NSW Vegetation Information System (VIS), the descriptions in Tozer et al (2010), and with reference to vegetation descriptions included by the Scientific Committee final determinations to list threatened communities under the *BC Act 2016 and* the *EPBC Act 1999.*

An assessment of fauna habitat was conducted within each survey quadrat to identify suitability for potential threatened fauna species known to occur in the local area.

The habitat assessment included the suitability of landscape features, hollow-bearing trees, stags, fallen timber and logs, rocky outcrops and boulders, flowering Eucalypts, specific feed trees for Glossy Black Cockatoo's, Swift Parrot, Koalas, Grey-headed Flying Fox, site connectivity, vegetation structure and vegetation types.

Searches were also undertaken for indirect evidence of native fauna, including scratches, scats, nests, hollows in use, camps, roosts, den sites etc. Opportunistic sightings of all fauna species were recorded throughout the survey period.

The following fauna survey methods were performed to target threatened species known to occur or likely to occur in the local area:

- General searched with direct observation of any fauna species present within the study area, including diurnal and nocturnal call identifications;
- Early morning dedicated bird surveys;
- Unbaited motion detection infra-red digital camera left within the NVC for a total of 16 survey nights;
- Anabat recording device left within the NVC for a total of 8 survey nights.

A list of fauna species recorded across all sites is provided in appendix D and E.

Within each 50m x 20m quadrat the following information was recorded:

- centre of western edge GPS location
- aspect and slope of midline
- photograph of midline from western centre edge
- IBRA region
- vegetation class
- Plant Community Type (PCT)
- stem class including recruitment
- standing hollow count
- overall length of logs

The quadrats 20m x 20m recorded:

- every flora species identified

- abundance of each species recorded
- count of stratum richness
- percentage of High Threat Weed (HTW) cover

From within the five 1m x 1m plots the following information was recorded:

- litter cover
- native overstorey foliage cover
- native midstorey foliage cover
- native groundcover foliage cover
- cryptogam cover
- rock cover
- bare ground

Results collected from the 1m x 1m plots at each site is displayed as an average.

2.3 CRITERIA TO MONITOR SUCCESS OF REHABILITATION

The Key Performance Indicators (KPI) to measure success of the biodiversity and rehabilitation effort of the Old Northern Road NVC and the vegetation management within the HRBOA have been outlined by Umwelt (Australia) Pty Ltd 2018. The following tables depict the performance and completion criteria for both locations.

Table 1. Performance and completion criteria for Old Northern Road NVC (taken from Umwelt Pty Ltd 2018)

Rehabilitation Performance and Completion Criteria	
Native Vegetation	Revegetation areas contain flora species assemblages characteristic of the desired native vegetation communities
	Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e. evidence of fruiting of native species observed)
	More than 75 percent of trees are healthy and growing as indicated by long term monitoring
	More than 50 percent of translocated or propagated threatened flora species survive as indicated by long term monitoring
	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum
Weeds and Pests	Regular inspections indicate a decline in weed diversity, density and abundance and a decline in signs of feral animal activity
	There is no significant weed infestation such that weeds do not comprise a significant proportion of species in any stratum
	There is no evidence of significant damage resulting from feral animal activity

Table 2. Performance and measurable indicators for HRBOA (taken from Cumberland Ecology 2016)

	Performance and measurable indicators
Native Vegetation	Maintenance of current level of native species diversity and abundance
	Maintenance of current level of canopy regeneration
	Measurable increase in habitat features
	Measurable decrease in impacts from feral fauna activity
Weeds	Measurable decline in weed density and distribution
	Measurable decline in weed diversity
	Limited recruitment of new weed species
Feral Animals	Observable reduction in decline of native fauna populations due to either predation by feral species, habitat degradation caused by feral fauna or competition with feral fauna
	Limited recruitment of new feral species
General	Measurable increase in the condition of vegetation
	Observable reduction in signs of erosion (if any)
	Evidence of restrictions to site access
	Observable decrease in bushfire risk

Furthermore, threatened flora species KPI for the translocated individuals and the flora species in-situ are to maintain or increase resident species population from the baseline levels which will be determined from this report.

Threatened fauna species previously identified at the Old Northern Road site and HRBOA are to be maintained or increase in population size based on a presence or absence survey each year following the baseline information within the Biodiversity Rehabilitation Management Plan (Umwelt Pty Ltd 2018).

2.4 SURVEY LIMITATIONS

The flora survey was conducted within a short timeframe during winter. Therefore some plant species may not have been identified due to the survey being performed when not in flower, or when dormant. It is noted that some flora species are seasonal, and may not have been visible at the time of the surveys. In addition to this, extreme dry weather conditions have been persistent for more than 18 months leading up to the survey period. Some species may therefore appear to be dead or dormant when they otherwise would not.

The survey limitations have been addressed through:

- consideration of flora and fauna species known to occur in the locality (including number of records from Bionet);
- consideration of habitat suitability present within the study areas and connectivity to other areas of habitat in the local landscape;
- consideration of current weather conditions;
- a conservative approach in assuming the presence of a species that could potentially be present in the study areas.

Where the study area contains potential habitat for threatened fauna species known to occur in the locality, and where survey areas support a likelihood of occurrence, it has been assumed on a conservative approach that such species may occur in the study area.

3 RESULTS

Results from the field surveys conducted over August and September 2019 have been separated into four distinct areas to enable quantification of condition for each specific location and its monitoring objectives.

3.1 OLD NORTHERN ROAD

The Old Northern Road NVC is currently in the mid stage of its rehabilitation strategy. Rehabilitation has begun within Lot 29 while extraction continues in Lot 1 and 2. Collection of propagation material from threatened flora species has taken place with numbers of successful clone individuals yet to reach the approved quota. Until this occurs, removal of the parent plant will be postponed.

Dedicated rehabilitation of native vegetation on Lot 29 begun in late 2017. An area approximately 0.8 hectares was selected and prepared for three rehabilitation methods to use as a comparison for future reference. The larger area (approximately 0.4 hectares) has been planted out using local provenance stock and plants derived from material collected from threatened species onsite. In total 47 species have been planted within the rehabilitation area, including two threatened species. Artificial habitat structures such as rock, logs and plant debris have been placed around the rehabilitation site to provide habitat for small birds and reptiles.

Two adjacent areas, of approximately similar sizes, have undergone rehabilitation in conjunction with the planted rehabilitation. The area to the immediate south of the planted rehabilitation has undergone translocation of plant material, including root balls of several species together. This is a particularly successful conservation tool when used for threatened species which have little chance of survival in their current location. This approach has been used here to relocate *Darwinia fascicularis subsp*. *Oligantha* along with flora species found within immediate and close proximity of each cluster of the threatened plants. Habitat features such as rocks, logs and plant debris have also been placed around the site to provide habitat for small birds, reptiles and to create microhabitats for dependant flora species.

The far western area of the NVC rehabilitation area has been spread with soil containing native seed bank and supplementary planting of threatened flora species. Habitat features have also been provided in this location.

Monitoring of vegetation condition has begun in other areas of the NVC, including areas which will be subjected to disturbance from sand extraction. The information gained from the pre-disturbance monitoring will provide Dixon Sand with quantitative data which can be used to rehabilitate the NVC back to, or close to, its pre-disturbance state.

Other areas of vegetation monitoring outside of the established rehabilitation corridor has also taken place to determine the effects of the sand extraction project on retained vegetation.

3.1.1 Rehabilitation area – Planted

The planted rehabilitation area is approximately 0.4 hectares in size and has been planted with 47 native species including 2 species listed on the BC Act 2016 as being species of significance, *Melaleuca deanei* (vulnerable) and *Darwinia fascicularis subsp. Oligantha* (endangered population). In addition to the revegetation planting a number of species have emerged from seed bank storage from the sub-soil which was spread over the rehabilitation site before planting commenced. In total 31 native species which were not recorded as planted within the rehabilitation site were identified during the survey period including the endangered species *Acacia byoneana*. This is an increase of 13 species since last year despite the dry weather conditions which have impacted on the area in the past 24 months. There were 3 weed species identified, 1 of which is listed as a High Threat Weed.

There were 16 live specimens of *Melaleuca deanei,* 25 live specimens of *Darwinia fascicularis subsp. Oligantha* and 4 live specimens of *Acacia byoneana* located within the planted rehabilitation area. Although there is a slight reduction of live specimens located this year it could be that these individuals were unable to be located due to the density of regrowth which has occurred throughout the site over the past 12 month period. The *A. byoneana* was showing signs of stress, most likely due to the weather conditions and predation by herbivores.

It was noted that several tree species still have stem support ties which are now beginning to restrict the outward growth of the stem. It is recommended these supports are removed immediately to reduce the risk of loss or deformity of these trees.

Image 1. View of planted rehabilitation area from north-west corner looking east 2018

Image 2. Comparison view of planted rehabilitation area from north-west corner looking east 2019

Image 3. View of planted rehabilitation area from south-east corner looking west 2018

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Image 4. Comparison view of planted rehabilitation area from south-east corner looking west 2019

Image 5. Planted *Melaleuca deanei* within the planted rehabilitation area 2019

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Image 6. Planted *Darwinia fascicularis subsp. Oligantha* within the planted rehabilitation area 2019

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Image 7. *Acacia byoneana* within the planted rehabilitation area 2019

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3.1.2 Rehabilitation area – Translocated

The translocated rehabilitation area was not subjected to a flora survey as per the vegetation survey site locations suggested in the Biodiversity Rehabilitation Management Plan 2018. However a random meander through the area recording flora species was undertaken. Species identified and recorded can be found in Appendix B. Photo monitoring should, over time, be sufficient to determine the rehabilitation success of this area.

Overall coverage of vegetation from the translocation and continued recruitment from seed bank storage appears to be ample. Translocated *Darwinia fascicularis subsp. Oligantha* is numerous, particularly on the western side of the site. All age classes were observed from small seedlings to adult shrubs which were flowering well at the time of the survey period.

There is currently no upper canopy within this area however *Eucalyptus sp,, Corymbia sp.* and *Angophora hispida* recruits were observed. Shrubs and ground cover plants are reasonably abundant throughout the area.

3.1.3 Rehabilitation area – Soil seed bank

The soil seed bank rehabilitation area was also not subjected to a flora survey as per the vegetation survey site locations suggested in the Biodiversity Rehabilitation Management Plan 2018. A random meander through the area recording flora species was undertaken and a count of living planted threatened species was recorded. Photo monitoring of the area will determine rehabilitation success.

Ample natural recruitment of native species is occurring across the site with recruitment of *Darwinia fascicularis subsp. Oligantha* evident. No canopy stratum is present although juvenile *Eucalyptus sp* were observed. *Acacia suaveolens* dominates the recovering shrub layer with *Grevillea buxifolia* and *Banksia ericifolia* also widespread. Ground cover species are present throughout.

There are currently 2 surviving planted *Melaleuca deanei* in tree protectors and 20 planted *Darwinia fascicularis subsp. oligantha* in tree protectors scattered throughout the site. It was noted that 2 of the *D. fascicularis subsp. oligantha* had perished. All the surviving individuals appear to be healthy. It is recommended the tree protectors are removed to allow the plants to grow in a more natural shape without the restriction of outwards movement.

Image 8. View of translocated rehabilitation area from south-west looking east 2018

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Image 9. Comparison view of translocated rehabilitation area from south-west looking east 2019

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Image 10. View of translocation rehabilitation area from north-west looking east 2018

Image 11. Comparison view of translocation rehabilitation area from north-west looking east 2019

Image 12. Mature *Darwinia fascicularis subsp. oligantha* shrub with some flowers visible 2019

Image 13. Juvenile *Darwinia fascicularis subsp. oligantha* within the translocated rehabilitation area 2019

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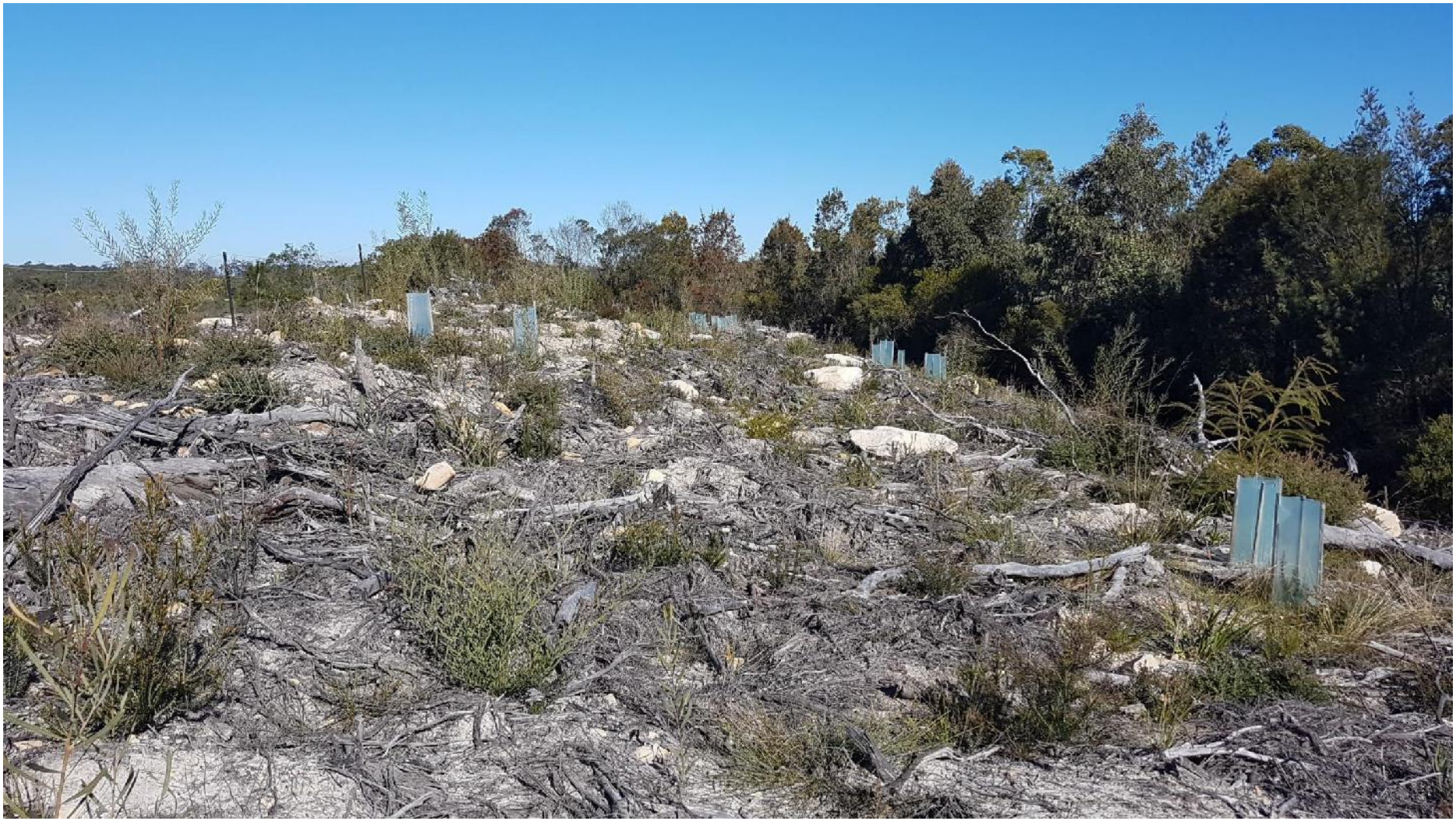

Image 14. View of soil seed bank rehabilitation area from north looking south 2018

Image 15. Comparison view of soil seed bank rehabilitation area from north looking south 2019

Image 16. View of soil seed bank rehabilitation area from south looking north 2018

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Image 17. Comparison view of soil seed bank rehabilitation area from south looking north 2019

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3.1.4 Vegetation monitoring within NVC

The Biodiversity Rehabilitation Management Plan 2018 indicates that nine vegetation monitoring sites should be established across the Old Northern Road site. Five of these sites occur within the NVC including the planted rehabilitation area discussed in 3.1.1 of this report.

From the remaining four sites only one could be safely accessed for monitoring. One of the monitoring sites is currently disturbed and in preparation for sand extraction while two of the other sites contain thickets of *Lantana camera* deeming the quadrat impenetrable for safe surveying.

The fifth site also contained thickets of *Lantana camera* however a section of native vegetation adjacent to the marked location was surveyed to provide some detail of biodiversity condition within the NVC.

The vegetation in the surveyed area is described in the Biodiversity Rehabilitation Management Plan 2018 as being *Eucalyptus punctata* woodland. The vegetation community in this location appears to be in a transition zone with influences from dry ridgetop woodland, heathland and gully forests emerging in one location. The species recorded within the survey site came to the determination that the VIS classification for this PCT best fit is *1328 - Yellow Bloodwood - Narrow-leaved Apple heathy woodland on hinterland plateaux of the Central Coast, Sydney Basin Bioregion.* Information collected during the survey period has been summarised in Table 3 while a full list of flora recorded can be found in Appendix A.

The overall health of the vegetation and biodiversity in the location of the survey site was moderate. There has been historic disturbance in the area most likely from livestock grazing and timber removal. The continued dry conditions throughout 2018 and 2019 have no doubt impacted upon the diversity of vegetation observed and identified during the survey period, in particular the forbs and ferns. Following a return to normal weather conditions it is expected the diversity of ground cover herbs will increase thus improving the overall biodiversity of the site.

The remaining areas throughout the NVC appear to be severely impacted from the presence of *Lantana camara*. An effort to remove and control the species appears to have begun within the *Eucalyptus punctata* woodland however much more work is needed to manage the species across the entire site.

Table 3. Survey summary from NVC survey site location ONR quadrat 2.

1328 - Yellow Bloodwood - Narrow-leaved Apple heathy woodland on hinterland plateaux of the Central Coast, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0313182 Northing – 06296257 Midline - 89°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	15 – 20m	*Corymbia gummifera, Eucalyptus punctata, Eucalyptus haemastoma, Angophora bakeri, Allocasuarina littoralis*		
Shrubs	0.5 – 2m	*Acacia linifolia, Grevillea buxifolia, Persoonia pinifolia, Phyllanthus hirtellus, Lambertia Formosa, Brachyloma daphnoides, Petrophile pulchella*		
Groundcover	0.1 – 0.5m	*Pratia purperascens, Pomax umbellata, Lomandra obliqua, Entolasia stricta, Themeda australis,*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm	✓		1	2
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓	✓		
<5cm	✓	✓		

Composition & Structure	**Composition Count**	**Structure cover %**
Trees	6	60
Shrubs	22	49
Grasses etc	8	36
Forbs	3	4
Ferns	1	2
Other	1	1
High Threat Weeds	0	0

Ecosystem Functions	
Length of habitat logs	44.1m
Litter cover	73%
Bare ground cover	1%
Cryptogam cover	56%
Rock cover	4%
Overstorey foliage cover	60%
Mid-storey foliage cover	22%
Groundcover foliage cover	23%

Image 18. Midline view of NVC survey quadrat 2 2019

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Image 19. Impenetrable thicket of *Lantana camara* within NVC 2019

Image 20. Impenetrable thicket of *Lantana camara* which has been treated with herbicide and is awaiting removal by Bush Regeneration contractors within NVC 2019

3.1.5 Vegetation monitoring outside NVC

There were four monitoring sites identified outside of the NVC which were proposed to be surveyed. One of these locations were unable to be accessed due to sand extraction currently taking place. Another of the locations was not able to be accessed due to impenetrable thickets of *Lantana camara*. Therefore only two locations were surveyed to provide baseline data for ongoing assessment.

The vegetation found at both sites was similar and therefore were both determined to be PCT *1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*. The site to the north of the large farm dam contained forest which demonstrated a much older structure with limited disturbance obvious. Large trees with hollow limbs and a reasonable diversity of species were found across this site. This survey location had been impacted from edge effects with *Lantana camara* growing along the road edge. Stage 4 of sand extraction on Lot 1 DP547255 will see the removal of this survey site in time. Therefore this site will provide baseline data for the benchmark values of long term rehabilitation of the PCT within the NVC and buffer area in the southeast corner of the site.

The second survey location outside of the NVC is within the 250m buffer area to Maroota Public School in the southeast corner of the site. This area has had historic disturbance most likely from timber harvesting. An abundance of *Eucalyptus piperita* are regenerating within this quadrat at around the same age class which suggests at some stage the area was once cleared. Despite this, the diversity within the survey site is reasonable and the biodiversity values are moderate. The area where this quadrat is located will not be subjected to clearing so will therefore provide an opportunity for monitoring the effects of sand extraction in nearby retained vegetation.

The remaining vegetation within the 250m buffer area appeared to have some impacts from the spread and growth of *Lantana camera* therefore a second survey quadrat within this area was not undertaken. Providing efforts are made to reduce the impacts from the species by the next reporting period are undertaken a further survey location may be introduced for the 2020 annual report.

Table 4. Survey summary for area outside NVC Survey site location ONR quadrat 1

1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0313041 Northing – 06296502 Midline - 70°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Corymbia gummifera, Eucalyptus piperita, Angophora costata, Allocasuarina littoralis, Ceratopetalum gummiferum*		
Shrubs	0.5 – 2m	*Acacia ulicifolia, Bossieae obcordata, Persoonia pinifolia, Phyllanthus hirtellus, Pultenaea flexilis, Lomatia silaifolia, Elaeocarpus reticulatus*		
Groundcover	0.1 – 0.5m	*Pomax umbellata, Pteridium esculentum, Pratia purpurascens, Entolasia stricta, Imperata cylindrica, Billardiera scandens, Smilax glyciphylla*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+	✓		1	1
50-79cm	✓		2	1
30-49cm	✓		1	
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓			
Composition & Structure		**Composition Count**		**Structure cover %**
Trees		5		42
Shrubs		16		28
Grasses etc		10		35
Forbs		4		3
Ferns		2		6
Other		5		5
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs	57.9m			
Litter cover	41%			
Bare ground cover	0%			
Cryptogam cover	55%			
Rock cover	0%			
Overstorey foliage cover	64%			
Mid-storey foliage cover	2%			
Groundcover foliage cover	32%			

Image 21. Midline view of ONR quadrat 1 2019

Table 5. Survey summary for survey site location ONR quadrat 3

1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0313250 Northing – 06296390 Midline - 230°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Eucalyptus piperita, Eucalyptus punctata, Angophora costata, Allocasuarina littoralis, Ceratopetalum gummiferum*		
Shrubs	0.5 – 2m	*Leptospermum polygalifolium, Kunzea ambugia, Phyllanthus hirtellus, Pultenaea flexilis, Epacris pulchella*		
Groundcover	0.1 – 0.5m	*Lomandra filiformis, Pteridium esculentum, Lomandra longifolia, Cythochaeta diandra, Entolasia stricta, Themeda australis*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		1	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		**Composition Count**	**Structure cover %**	
Trees		6	100	
Shrubs		13	31	
Grasses etc		10	54	
Forbs		8	7	
Ferns		1	1	
Other		3	3	
High Threat Weeds		0	0	
Ecosystem Functions				
Length of habitat logs	13.1m			
Litter cover	81%			
Bare ground cover	0%			
Cryptogam cover	36%			
Rock cover	4%			
Overstorey foliage cover	73%			
Mid-storey foliage cover	28%			
Groundcover foliage cover	27%			

Image 22. Midline view of ONR quadrat 3 2019

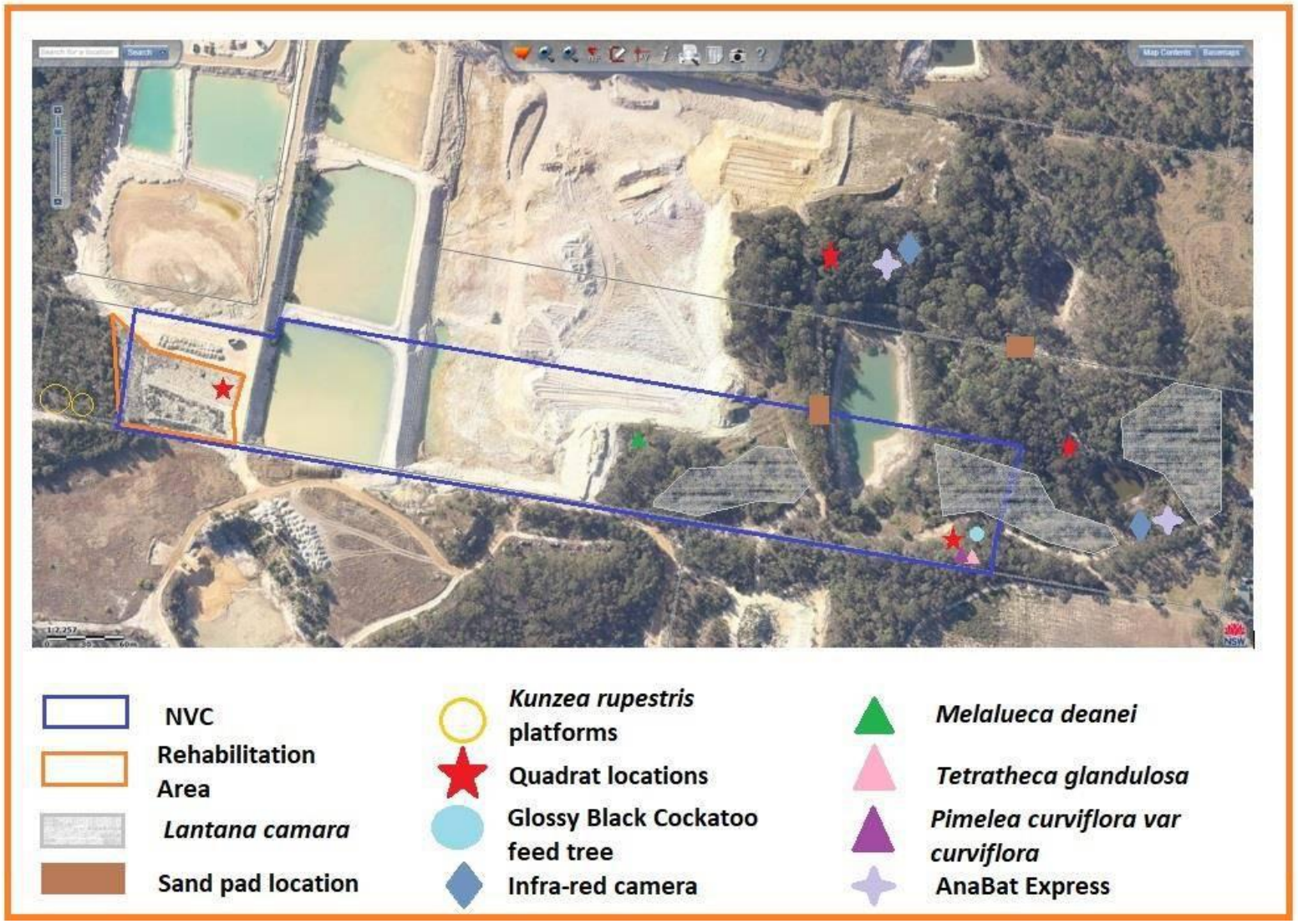

Image 23. ONR survey site locations

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3.2 HAERSES ROAD BIODIVERSITY OFFSET AREA

The HRBOA has a total of five monitoring sites specifically to provide benchmark values for the vegetation communities found within the site. Baseline data collected and discussed within this report will enable a measurable value of success for management actions which may be implemented over the life of the offset.

It is expected over time there will be an increase in biodiversity, habitat features, ongoing evidence of natural recruitment and a decrease in exotic fauna and flora presence.

Each of the survey locations has been permanently marked with a steel post and yellow cap indicating the plot identification number.

Cumberland Ecology (2016) had previously identified four vegetation communities onsite as Sydney sandstone Ridgetop Woodland, Sydney Hinterland Transition Woodland, Sydney Sandstone Gully Forest and Sydney Sandstone Heath (Heath/Woodland Complex). Each survey location surveyed was given a best fit PCT based on the classification of the VIS which was determined by the native species most abundant throughout the quadrat. Therefore the following PCT's were identified:

- Plot 1 - *1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*
- Plot 2 – *1641 – Dwarf Apple – Scribbly Gum heathy low woodland on sandstone ranged of the Central Coast*
- Plot 3 - *1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion*
- Plot 4 – *1627 – Smooth-barked Apple – Turpentine – Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast*
- Plot 5 – *1643 – Red Bloodwood – Smooth-barked Apple – Scribbly Gum – Old Man Banksia heathy woodland on sandstone ranges of the Central Coast*

These PCT's are in line with the broader definition given in the Cumberland Ecology Biodiversity Management Plan 2016, although the location of the Sydney Hinterland Transition Forest was not surveyed.

Plot 2 had an abundance of the threatened flora species *Darwinia biflora* present. This shrub was noted to be very well represented throughout the entire area of the PCT 1641.

The following tables (6 – 10) are a summary of the survey results at each of the plot locations across HRBOA.

Table 6. Survey summary for survey site location HRBOA quadrat 1

1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312740 Northing – 06293489 Midline - 130°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Angophora costata, Corymbia gummifera, Allocasuarina littoralis, Ceratopetalum gummiferum, Banksia Serrata*		
Shrubs	0.5 – 2m	*Leptospermum trinervium, Persoonia pinifolia, Lambertia Formosa, Bossiaea scolpendria, Grevillea speciosa, Epacris pulchella*		
Groundcover	0.1 – 0.5m	*Caustis flexosa, Pteridium esculentum, Lomandra glauca, Cassytha glabella, Smilax glyciphylla, Xanthorrhoea media*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm	✓		1	1
30-49cm	✓		1	
20-29cm	✓	✓		
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		**Composition Count**	**Structure cover %**	
Trees		5	60	
Shrubs		22	52	
Grasses etc		6	12	
Forbs		3	4	
Ferns		1	8	
Other		5	4	
High Threat Weeds		0	0	
Ecosystem Functions				
Length of habitat logs	26.5m			
Litter cover	70%			
Bare ground cover	2%			
Cryptogam cover	2%			
Rock cover	26%			
Overstorey foliage cover	72%			
Mid-storey foliage cover	13%			
Groundcover foliage cover	17%			

Figure 24. Midline view of HRBOA quadrat 1 2019

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Table 7. Survey summary for survey site location HRBOA quadrat 2

1641 – Dwarf Apple – Scribbly Gum heathy low woodland on sandstone ranged of the Central Coast				
AGD Zone 56 Easting – 0312750 Northing – 06293649 Midline - 100°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	2 – 10m	*Angophora hispida, Eucalyptus haemastoma*		
Shrubs	0.5 – 2m	*Banksia ericifolia, Hakea sericea, Leptospermum trinervium, Hakea dactyloides, Lambertia Formosa, Bossiaea scolpendria, Grevillea speciosa, Epacris pulchella*		
Groundcover	0.1 – 0.5m	*Caustis pentandra, Actinotus minor, Xanthoria tridentata, Asplenium trichomanes, Lepidosperma laterale, Cassytha glabella, Entolasia stricta*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm	✓		1	
30-49cm		✓		
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		

Composition & Structure	**Composition Count**	**Structure cover %**
Trees	2	20
Shrubs	24	100
Grasses etc	7	45
Forbs	4	5
Ferns	2	2
Other	3	4
High Threat Weeds	0	0

Ecosystem Functions	
Length of habitat logs	9.3m
Litter cover	55%
Bare ground cover	8%
Cryptogam cover	20%
Rock cover	8%
Overstorey foliage cover	13%
Mid-storey foliage cover	34%
Groundcover foliage cover	24%

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Image 25. Midline view of HRBOA quadrat 2 2019

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Image 26. Flowering *Darwinia biflora* located within HRBOA quadrat 2

Table 8. Survey Summary of survey location HRBOA quadrat 3

1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312877 Northing – 06293628 Midline - 110°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Corymbia gummifera, Eucalyptus piperita, Eucalyptus punctata, Banksia serrata, Ceratopetalum gummiferum, Allocasuarina littoralis*		
Shrubs	0.5 – 2m	*Leptospermum trinervium, Dodonea viscosa, Persoonia pinifolia, Bossiaea lenticularis, Grevillea speciosa, Epacris pulchella*		
Groundcover	0.1 – 0.5m	*Dianella caerulea, Pteridium esculentum, Lindsaea microphylla, Lomandra filliformis, Lomandra multiflora, Cassytha glabella, Entolasia stricta, Caustis flexosa*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm	✓		3	
30-49cm	✓		1	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		**Composition Count**	**Structure cover %**	
Trees		7	90	
Shrubs		18	46	
Grasses etc		9	12	
Forbs		6	2	
Ferns		2	6	
Other		3	3	
High Threat Weeds		0	0	
Ecosystem Functions				
Length of habitat logs	4.1m			
Litter cover	43%			
Bare ground cover	11%			
Cryptogam cover	18%			
Rock cover	22%			
Overstorey foliage cover	17%			
Mid-storey foliage cover	10%			
Groundcover foliage cover	13%			

Figure 27. View of midline HRBOA quadrat 3 2019

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Figure 28. Dural Land Snail shell located within HRBOA quadrat 3

Figure 29. Dural Land Snail shell located within HRBOA quadrat 3

Table 9. Survey Summary of survey location HRBOA quadrat 4

1627 – Smooth-barked Apple – Turpentine – Sydney Peppermint heathy woodland on sandstone ranges of the Central Coast				
AGD Zone 56 Easting – 0312847 Northing – 06293808 Midline - 100°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Corymbia gummifera, Eucalyptus resinifera, Angophora costata, Callicoma serratifolia, Ceratopetalum gummiferum, Allocasuarina littoralis*		
Shrubs	0.5 – 2m	*Leptospermum trinervium, Telopea speciossima, Persoonia pinifolia, Bossiaea lenticularis, Lambertia formosa, Boronia floribunda*		
Groundcover	0.1 – 0.5m	*Dianella caerulea, Pteridium esculentum, Gahnia sieberiana, Lomandra filliformis, Lomandra longifolia, Smilax glyciphylla, Entolasia stricta, Caustis flexosa*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+	2		2	1
50-79cm	✓		2	3
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm				
<5cm	✓	✓		
Composition & Structure		**Composition Count**	**Structure cover %**	
Trees		7	80	
Shrubs		18	70	
Grasses etc		13	24	
Forbs		5	3	
Ferns		3	12	
Other		3	2.5	
High Threat Weeds		0	0	
Ecosystem Functions				
Length of habitat logs	33.8m			
Litter cover	46%			
Bare ground cover	5%			
Cryptogam cover	40%			
Rock cover	9%			
Overstorey foliage cover	15%			
Mid-storey foliage cover	40%			
Groundcover foliage cover	16%			

Image 30. View of midline HRBOA quadrat 4 2019

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Table 10. Survey Summary of survey location HRBOA quadrat 5

1643 – Red Bloodwood – Smooth-barked Apple – Scribbly Gum – Old Man Banksia heathy woodland on sandstone ranges of the Central Coast				
AGD Zone 56 Easting – 0312938 Northing – 06293983 Midline - 130°				
Vegetation Layer	**Height Range**	**Vegetation Layer**		
Trees	20 – 30m	*Eucalyptus punctata, Eucalyptus haemastoma, Angophora hispida, Banksia serrata, Allocasuarina littoralis*		
Shrubs	0.5 – 2m	*Lambertia formosa, Persoonia pinifolia, Bossiaea scolopendra, Grevillea buxifolia, Banksia ericifolia, Boronia floribunda, Epacris pulchella*		
Groundcover	0.1 – 0.5m	*Actinotus minor, Xanthosia pilosa, Lomandra longifolia, Entolasia stricta, Xanthorrhoea resinosa*		
Stem Class			**Hollows**	
Dbh	**Eucalyptus**	**Non-Eucalypt**	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		3	
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		**Composition Count**	**Structure cover %**	
Trees		5	17	
Shrubs		27	62	
Grasses etc		11	11	
Forbs		2	5	
Ferns		2	1	
Other		2	1	
High Threat Weeds		0	0	
Ecosystem Functions				
Length of habitat logs	18.9m			
Litter cover	46%			
Bare ground cover	1%			
Cryptogam cover	18%			
Rock cover	30%			
Overstorey foliage cover	12%			
Mid-storey foliage cover	13%			
Groundcover foliage cover	9%			

Image 31. View of midline HRBOA quadrat 5 2019

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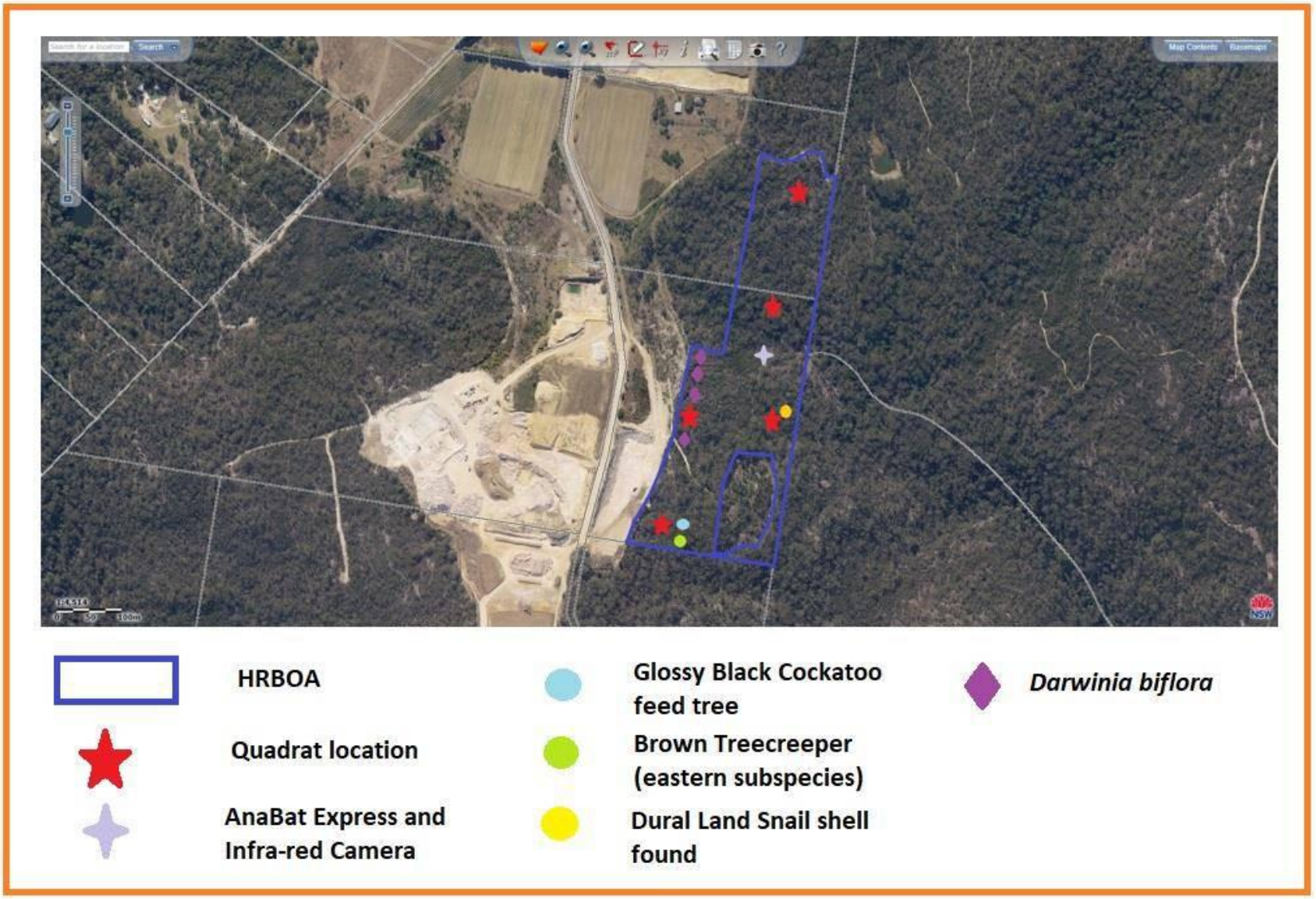

Image 32. HRBOA site location

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3.3 Threatened Flora Monitoring

The threatened flora monitoring details the current condition of the four threatened flora species and their immediate habitat which has been previously recorded onsite. The far western area of Lot 29 contains a significant rock platform which supports *Kunzea rupestris* and *Darwinia fascicularis subsp oligantha*. Lot 2 contains *Melaleuca deanei* and *Tetratheca glandulosa*. During flora surveying in September 2019 *Pimelea curviflora var curviflora* was also identified.

The overall health of the *Kunzea rupestris* population is reasonable considering the current dry weather conditions. Some dieback and plant loss was observed however the remaining plants appeared to be in good health. Some recruitment was evident, particularly on the western rock platform where vacant soil is available. Budding and some flowers were observed during the survey period. Mosses and lichens were present in each patch on both platforms although extremely dry.

The eastern rock platform has been divided into four individual patches. Patch one had previously identified twenty six individual plants which were all accounted for in 2018. However, most likely due to the current dry weather conditions and the extreme temperatures during the summer months over 2017/2018/2019, two plants had died and a further two are showing signs of dieback. These plants were outliers from the main clump which is most likely why they were affected. The remaining patch is in relatively good health given the extreme dry weather conditions. *Darwinia fascicularis subsp oligantha* was also present within this patch although the *Calytrix tetragona* appears to have perished from the adverse weather conditions.

Patch two is much smaller with only three plants present. All three are demonstrating signs of dieback and the *Calytrix tetragona* previously identified within this patch appears to have died. Within patch three, only two plants, also showed signs of dieback mostly on the lower limbs where reflective heat from the surrounding sandstone is the likely cause. Within patch four only the five *Kunzea rupestris* appears to have survived despite showing some signs of minor dieback. The *Entolasia stricta* and *Calytrix tetragona* previously recorded as present have perished in the dry conditions.

The western rock platform has been divided into five individual patches which are much more widely distributed than the patches on the eastern rock platform. Within this section the *Kunzea rupestris* grows within a vegetation community with far more flora diversity than what is present on the eastern rock platform. Some of the shrubs are therefore much larger as soil depth and protection from external influences (such as wind and radiant heat) is more readily available.

Patch one has six plants present, three of which are demonstrating some dieback. *Calytrix tetragona* and *Darwinia fascicularis subsp oligantha* were also present within this patch. A *Banksia ericifolia* which was previously recorded within this patch has died. Patch two is a long patch which runs down the length of the rock platform. There appears to have been very little change to this patch from last year. New recruits appear to be healthy despite the dry weather and lack of moss and lichens covering the growing medium. In total twenty individual plants were identified within this patch. All plants in this location are low growing and showed little or no evidence of dieback. Additional species identified within this patch included *Calytrix tetragona*, *Acacia hispidula*, *Grevillea buxifolia, Caustis flexuosa* and *Darwinia fascicularis subsp oligantha.*

Patch three does not contain any *Kunzea rupestris* plants. The patch is considered for monitoring over time with the hope that new recruits will eventually appear. A single *Leucopogon parviflorus* is currently the only species within this patch.

Patch four has previously identified sixteen individual plants. All sixteen were identified during the 2018 survey with the addition of six new recruits growing under the canopy of neighbouring flora species. There was no evidence of dieback on any of the plants identified in this patch. Other flora species identified within the patch were *Calytrix tetragona*, *Grevillea buxifolia, Caustis flexuosa*, *Darwinia fascicularis subsp oligantha, Banksia ericifolia, Isopogon anethifolius, Bossiaea scolopendria* and *Petrophile pulchella.*

Patch five had sixteen *Kunzea rupestris* growing within a diverse mix of shrub species. The new recruits close to the old haul track appear to be healthy and withstanding the dry conditions. No plants appear to have evidence of dieback although some *Banksia ericifolia, Isopogon anethifolius* and *Calytrix tetragona* were demonstrating some dieback and loss. Other species within this patch include *Acacia ulicifolia, Corymbia eximia, Dianella revolute, Grevillea buxifolia, Grevillea speciosa, Leucopogon parviflorus, Angophora hispidula, Caustis flexuosa*, *Persoonia levis*, *Isopogon anethifolius* and *Petrophile pulchella.*

Other threatened species located onsite were observed and inspected for current health and condition. The previously recorded *Melaleuca deanei* is still currently undisturbed within the Banksia heath plant community. Propagation material will be removed during Spring 2019 in an attempt to produce further successful clones from the parent plant. The plant appears to have not suffered any ill effects from previous multiple small branch removal during propagation. No flowers were observed during the survey period, although the survey was not undertaken in the normal flowering season so flowers were not to be expected. In total there were 31 stems in 18 clumps covering an area of 25m^2. The highest shrubs were approximately 2.5m tall.

Darwinia fascicularis subsp oligantha was observed as being plentiful in the location of the *Kunzea rupestris* population and surrounding area. Plants were flowering well and new recruits were evident throughout the area. They were also very well represented throughout the rehabilitation areas. The *Tetratheca glandulosa* plant previously observed onsite could not be located. It is likely this plant has died from the dry weather conditions or has fallen victim to predation from herbivore grazers. However *Tetratheca glandulosa* was identified within the quadrat site 1 during the September 2019 flora survey period. In addition to this *Pimelea curviflora var curviflora* was also identified within the same quadrat site. These species within this location will now be monitored each year they remain present onsite.

Image 33. *Kunzea rupestris* monitoring eastern rock platform photo location 1 2019

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Image 34. *Kunzea rupestris* monitoring eastern rock platform photo location 2 2019

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Image 35. 2019 eastern rock platform patch number 1-4, top 1 - bottom 4

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Image 36. *Kunzea rupestris* monitoring western rock platform photo location 1 2019

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Image 37. *Kunzea rupestris* monitoring western rock platform photo location 2 2019

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Image 38. *Kunzea rupestris* monitoring western rock platform photo location 3 2019

Image 39. 2019 western rock platform patch number 1-5, top left 1 top right 2 middle left 3 middle right 4 bottom 5

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Image 40. *Kunzea rupestris* in flower on eastern rock platform September 2019

Image 41. *Darwinia fascicularis subsp. oligantha* in flower on western rock platform September 2019

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3.4 Threatened Fauna Monitoring

Threatened fauna previously located within the Old Northern Road site included four species of microchiropteran bat and a Glossy Black Cockatoo.

A search was undertaken for Glossy Black Cockatoo feed trees throughout the site. Feed tree location was confirmed to the north west of the large farm dam as demonstrated by Cumberland Ecology in the 2016 Flora and Fauna Monitoring Program. Four individual birds were observed flying over the quarry operation, heading north, during the survey of the rehabilitation area in August 2019. The sex and age of the birds were undetermined.

An AnaBat Express sound recorder was left in place over 8 survey nights. The results were sent to Dr Anna McConville from Echo Ecology and Surveying for analysis. None of the previously recorded threatened species were recorded within the survey area during this survey period. Live trapping was not conducted to reduce unnecessarily stress on fauna. The extreme hot and dry weather conditions over the summer period when this survey was undertaken may have influenced the foraging movement of these nomadic species. A return to average weather conditions may influence their return.

No other threatened fauna were observed within or immediately surrounding the Old Northern Road site during the survey period. The pair of Wedged-tailed Eagles which were observed flying over the site and then perching in a tree on the neighboring property during last years monitoring survey were again sighted this year.

The HRBOA previously had two threatened fauna species recorded on the property, although outside of the offset area. A historic Bionet record of a Koala and Glossy Black Cockatoo sighting to the north of the property towards Hitchcock Road was not investigated any further for the purpose of this report. Koala sightings in the area have been extremely far and few since the 2002 bushfires when it is believed any remaining population was most likely killed. Nevertheless a search for Koala scat under *Eucalyptus punctata* within all survey quadrats at the HRBOA was undertaken. No scats were found.

Glossy Black Cockatoo feed trees were observed within quadrat 1. It is likely more feed trees will be observed within the site over time as more surveying is undertaken. Several Brown Treecreepers were observed foraging within the site at various locations throughout the survey period. No other threatened fauna species were observed during the 2019 survey period. A survey for microchiropteran bat species using an AnaBat Express sound recorder was undertaken during February 2019. The Large-eared Pied Bat and the Little Bent-winged Bat were identified by Dr Anna McConville over 4 nights of survey effort. The entire results can be seen in Appendix D and E.

3.5 Exotic Species

Exotic flora species were identified within the NVC and 250m buffer area at the Old Northern Road site. Three species considered as High Threat Weeds under the Biosecurity Act 2015 occur on the property, Whiskey Grass *Andropogon virginicus,* Fireweed *Senecio madagascariensis* and the most widespread on the property Lantana *Lantana camara.* A weed management program is currently in place and will continue throughout the life of the

rehabilitation plan. There were no weeds identified within the HRBOA however annual sweeps of the property are recommended to ensure any outbreaks are managed and controlled before species become established.

Exotic fauna species were identified within the NVC at the Old Northern Road site. Infra-red cameras were left in place for 16 survey nights and 2 sand plots were established and checked every second morning for 8 days.

The sand plots had evidence of several species using the trails. For the purpose of the exotic fauna monitoring three species were identified: European Red Fox, Cat and Dog. The full results can be seen in Appendix D. Sand plot monitoring was not undertaken at HRBOA however tracks were regularly checked for fauna prints. One cat print was identified on a track between quadrat 1 and 2.

European Rabbit scats were observed in several locations within the NVC in low to moderate density. It could then be assumed that carnivore scats also observed onsite were most likely from the European Red Fox. As no Rabbits were observed feeding during the day, scats were not in high density and warrens were not observed the population can be considered to be low to moderate and likely to be kept under control by biological means such as predation from foxes, dogs, cats and birds of prey such as the Wedge-tailed Eagle observed flying nearby. Should the number of rabbits become problematic then it may be necessary to engage in a control program to reduce or eliminate the population.

The Noisy Minor, *Manorina melanocephala*, was also observed within the NVC and 250m buffer area at the Old Northern Road Site. Although this bird is a native species to eastern Australia it is worth mentioning here as the species is considered a pest in high density and a Key Threatening Process to many threatened species of small bird including the Brown Treecreeper, which was identified at HRBOA. The population of Noisy Minor appeared to be small and a variety of small birds were observed on site during the survey period. The population should be monitored over time to ensure the species does not become dominant and eliminate other bird species from the vegetation.

3.6 Assessment Against Criteria

The results of the field survey were assessed against the criteria for successful rehabilitation (Table 11).

Table 11. Assessment against criteria to monitor success of rehabilitation

Category	Performance Criteria	Target Achieved	Comments
Native Vegetation	More than 75% of trees are healthy and growing as indicated by long term monitoring	YES	More than 75% of the native vegetation within the active rehabilitation area is healthy and is growing as expected for long term survival despite recent dry weather conditions. Evidence of minimal loss can be seen.
	More than 50% of translocated or propagated threatened flora species survive as indicated by long term monitoring	YES	More than 50% of translocated and planted propagated threatened flora species has survived despite the recent dry weather conditions. To date at least 45 propagated *Darwinia fascicularis subsp. Oligantha* and 21 propagated *Melaleuca deanei* have survived transplanting in the rehabilitation area. A complete count of translocated *Darwinia fascicularis subsp. Oligantha* was not undertaken at the time of relocation however it appears that any losses that may have occurred were minimal and new recruits are now visible throughout much of the area.
Vegetation Structure	Revegetation areas contain flora species assemblages characteristic of the desired native vegetation communities	N/A	At this stage it is too early in the rehabilitation process to determine if the desired vegetation community is being established. Species planted have been specifically chosen to recreate a Banksia Heath community.
Ecosystem Function	Second generation tree seedlings are present or likely to be, based on monitoring comparable older rehabilitation sides (evidence of fruiting of native species observed)	N/A	It is too early in the rehabilitation process for second generation tree seedlings. Fruiting of tree species is not expected for 5 years following the original planting (i.e. 2022).
	Habitat values retained or beginning to develop and improve over time (leaf litter, fallen timber etc)	N/A	Habitat values have been added to the rehabilitation site in the form of logs and vegetation debris. The site is not yet at the age where it will begin to form its own habitat value. This is expected to begin between 5-10 years following the original planting.
Weeds and Pests	Regular inspections indicate a decline weed diversity, density and abundance and a decline in signs of feral animal activity	YES	There were very few weed species within the rehabilitation area. No signs of feral animal activity.

	There is no significant weed infestation such that weeds do not comprise a significant proportion of the species in the stratum	YES	There is no significant weed infestation within the rehabilitation area. Significant weed infestations are located within the NVC outside of the rehabilitation area.
	There is no evidence of significant damage resulting from feral animal activity	YES	There is no evidence of significant damage caused from feral animal activity within the rehabilitation area.

4 DISCUSSION AND RECOMMENDATIONS

This is the second Annual Biodiversity and Rehabilitation Management Report produced for Dixon Sand Modification 5. Rehabilitation work is in the early stages and will increase with both intensity and measurable criteria in the years that follow.

This report provides information which will allow for measurable and quantifiable data to be compared over time as the rehabilitation and monitoring continues.

Due to the ongoing dry weather conditions which have persisted from mid 2017 and throughout 2018/2019 a reduction in ground cover herbaceous flora was thought to have occurred in all sites monitored. Ferns were especially not well represented, even in plant communities in which they would normally occur in higher density. It is therefore expected following a return to average weather conditions this stratum layer will demonstrate the biggest increase in density and diversity. However if dry conditions continue through to the following annual reporting period it may be expected that this layer could almost completely disappear in some areas and a reduction in shrub diversity and density could also take place.

That being said there was a slight increase within the forb layer in most quadrat locations at ONR and HRBOA. Small trees and large shrubs demonstrated a small but noticeable loss both in composition and structure while grasses also resulted in an overall average slight loss. This can most certainly be contributed to the ongoing dry conditions with an expectation of improvement to be seen once average rainfall returns.

Threatened species located within the NVC and HRBOA may also be negatively affected if the dry weather conditions continue over the next reporting period. In particular the *Kunzea rupestris* which is already showing signs of dieback and loss due to its shallow rooted habitat on exposed sandstone shelves. Some of the shrub species which offer shade for these areas have experienced loss within the past 12 month period which may have negative impacts upon the remaining threatened species. Should another dry summer with extreme temperatures occur, it is likely more loss will take place.

Weed species, particularly *Lantana camara*, within the 250m school buffer area of the Old Northern Road site should remain a priority management species for removal and control over the next twelve month period. It was noted that management of this weed has commenced within the past 12 month period. Without management this species is likely to spread over a larger area in turn supporting habitat for exotic fauna species such as the European Rabbit and the European Red Fox. Suitable techniques for removal have been provided in appendix F.

Rehabilitation efforts have begun in earnest with native plant relocation, propagation and planting taking place over the preceding 24 months. Continued propagation of threatened species will persist and supplementary planting within the rehabilitation area will continue.

It is not expected any new rehabilitation areas will commence over the next twelve month period within the NVC however native rehabilitation work will commence along the western embankment at the front entrance to the quarry site.

5 LIMITATIONS AND ASSUMPTIONS

This study was limited by the timing and frequency of the survey. There may be flora and/or fauna species present at the site that were not recorded due to their seasonal, territorial or cryptic nature.

It can never be proven that threatened species have not, do not or will not use the site as habitat. The conclusions drawn in this report are a result of testing, observation and experience.

This report describes the habitat and vegetation of the site at the time of the field survey. Vegetation and habitat will change over time and therefore the findings of this report are only relevant for the current proposal and for the duration of the application.

6 QUALIFICATIONS AND EXPERIENCE OF THE AUTHOR AND FIELD ECOLOGIST

The Author and Field Ecologist, Melissa Mass, has formal qualifications including a Bachelor of Applied Science (B. App. Sc.), majoring in Ecology, and a Certificate 3 in Horticulture. Her current Scientific Licence number issued from the NSW OEH is SL101441 with expiry date 31st Oct 2019. Furthermore an Animal Research Authority issued by the NSW Animal Care and Ethics Committee is current to undertake general survey work in THSC local government area with expiry 23rd Mar 2021. Melissa is an accredited Biodiversity Assessor conforming to the requirements as imposed by OEH with Accreditation number being BAAS18053.

Melissa has been working as an Ecologist for 11 years. Her work has included targeted threatened species assessment and management, reviews of environmental factors, bush regeneration, environmental impact assessments, and environmental survey and monitoring.

Melissa has a strong focus on threatened species ecology and has actively contributed to the Long-nosed Potoroo National Recovery Plan.

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8 APPENDIX

APPENDIX A – FLORA SPECIES IDENTIFIED WITHIN THE ONR STUDY AREA

Status	Botanical Name	Common Name	Plot 1	Plot 2	Plot 3
	Acacia linifolia	White Wattle	*		
	Acacia parrattensis	Parramatta Wattle	*	*	
	Acacia suaveolens	Sweet Wattle	*		*
	Acacia ulicifolia	Prickly Moses		*	
	Actinotus minor	Lesser Flannel Flower			*
	Allocasuarina littoralis	Black She-oak	*		*
	Angophora bakeri	Narrow-leaved Apple	*		
	Angophora costata	Smooth Barked Apple		*	*
	Aristida vagans	Threeawn Speargrass			*
	Aristida warburgii	Fine Leaf Wire Grass	*		*
	Austrostipa pubescens	Spear Grass		*	*
	Banksia spinulosa	Hairpin Banksia		*	
	Billardiera scandens	Hairy Apple Berry	*	*	*
	Bossiaea lenticularis	Bossiaea		*	
	Bossiaea obcordata	Spiny Bossiaea	*		*
	Brachyloma daphnoides	Daphne Heath		*	
	Breyenia oblongifolia	Coffee Bush		*	
	Cassytha glabella	Slender Devils Twine			*
	Ceratopetalum gummiferum	NSW Christmas Bush		*	*
	Clematis aristata	Old Mans Beard		*	
	Comesperma ericinum	Heath Milkwort		*	
	Corymbia gummifera	Red Bloodwood	*	*	*
	Cyathochaeta diandra	Sheath Rush		*	
	Desmodium varians	Slender Tick Tre-foil		*	
	Dianella caerulea var. product	Blue Flax Lily	*	*	*
	Dodena viscosa	Sticky Hop Bush		*	
	Elaeocarpus reticulatus	Blueberry Ash		*	
	Entolasia marginata	Bordered Panic	*		
	Entolasia stricta	Wiry Panic	*	*	*
	Epacris pulchella	Wallum Heath			*
	Eragrostis brownii	Brown's Lovegrass		*	*
	Eucalyptus haemastoma	Scribbly Gum	*		
	Eucalyptus piperita	Sydney Peppermint		*	*
	Eucalyptus punctata	Grey Gum	*		*
	Gonocarpus teucrioides	Raspwort		*	
	Goodenia rotundifolia	Star Goodenia			*
	Grevillea buxifolia	Grey Spider Flower	*		*
	Grevillea mucronulata	Green Spider Flower			*
	Grevillea speciosa	Red Spider Flower	*		
	Hakea dactyloides	Broad Leaved Hakea	*		
	Hakea sericea	Needlebush	*		*

	Hardenbergia violacea	False Sarsaparilla		*	
	Hovea linearis	Common Hovea		*	
	Imperata cylindrica	Blady Grass		*	
	Jacksonia scoparia	Dogwood	*		
	Kunzea ambigua	Tickbush			*
	Lambertia formosa	Mountain Devil	*		
	Leptospermum polygalifolium	Tantoon			*
	Leucopogon lancelatus	Lance-beard Heath		*	
	Lindsaea microphylla	Lacy Wedge Fern		*	
	Lomandra filiformis	Wattle Mat-rush	*	*	*
	Lomandra longifolia	Spiny-headed Mat-rush	*	*	*
	Lomandra multiflora	Many Flowered Mat-rush	*	*	*
	Lomandra obliqua	Fish Bones	*	*	*
	Lomatia silaifolia	Crinkle Bush	*	*	
	Ozothamnus diosmifolius	Rice Flower	*	*	*
	Persoonia levis	Broad Leaved Geebung	*		*
	Persoonia pinifolia	Pine-leaved Geebung	*	*	
	Petrophile pulchella	Conesticks	*		*
	Phyllanthus hirtellus	Thyme Spurge	*	*	*
V	*Pimelea curviflora var. Curviflora*	Pimelea curviflora var. curviflora	*		
	Pimelea linifolia	Slender Rice Flower	*		
	Platysace linearifolia	Carrot Tops		*	*
	Pomax umbellata	Pomax	*		
	Pratia purpurascens	Whiteroot	*		
	Pteridium esculentum	Bracken Fern	*	*	*
	Pultenaea flexilis	Graceful Bush Pea	*	*	*
	Rytidosperma racemosum	Wallaby Grass	*		
	Scaevola ramosissima	Purple Fan-flower		*	*
	Smilax glyciphylla	Sweet Sarsaparilla		*	*
	Stylidum lineare	Slender Trigger Grass		*	
V	*Tetratheca glandulosa*	Glandular Pink Bells	*		
	Themeda australis	Kangaroo Grass	*	*	*
	Xanthorrhoea resinosa	Grass Tree	*	*	
	Xanthosia pilosa	Woolly Xanthosia			*
	Xanthosia tridentata	Rock Xanthosia			*
	Xylomelum pyriforme	Woody Pear		*	

V – Vulnerable Species

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APPENDIX B – FLORA SPECIES IDENTIFIED WITHIN ONR REHABILITATION AREA

Status	Botanical Name	Common Name	Rehab 1	Translocate	Soil seedbank
En	*Acacia byoneana*	Byone's Wattle	Seed bank		
	Acacia parramattensis	Parramatta Wattle	Seed bank	*	
	Acacia suaveolens	Sweet Wattle	Planted	*	*
	Acacia ulicifolia	Prickly Moses	Planted	*	*
	Actinotus minor	Lesser Flannel Flower	Seed bank		*
	Allocasuarina littoralis	Black She-oak	Planted	*	*
HTW	*Andropogon virginicus*	Whiskey Grass	Seed bank	*	*
	Angophora costata	Smooth Barked Apple	Planted		
	Angophora hispida	Dwarf Apple	Planted	*	
	Aristida vagans	Threeawn Speargrass	Planted	*	*
	Aristida warburgii	Fine-leafed Wire Grass		*	
	Asplenium trichomanes	Common Spleenwort		*	
	Austrostipa pubescens	Spear Grass	Seed bank	*	*
	Banksia ericifolia	Heath-leaved Banksia	Planted	*	*
	Banksia serrata	Old Man Banksia	Planted		
	Banksia spinulosa	Hairpin Banksia	Planted	*	*
	Billardiera scandens	Hairy Apple Berry	Seed bank	*	
	Boronia floribunda	Pale Pink Boronia	Seed bank		*
	Boronia ledifolia	Sydney Boronia		*	
	Bossiaea ensata	Sword Bossiaea	Seed bank		*
	Bossiaea obcordata	Spiny Bossiaea	Planted	*	*
	Callistemon linearis	Narrow-leaved Bottlebrush	N/Id		
	Callistemon pinifolius	Pine-leaved Bottlebrush	N/Id		
	Calytrix tetragona	Common Fringe Myrtle	Planted	*	*
	Cassytha glabella	Slender Devils Twine	Seed bank	*	
	Caustis pentandra	Curly Wig	Seed bank	*	
	Cheilanthes seiberi	Mulga Fern		*	
	Corymbia eximia	Yellow Bloodwood	Planted	*	
	Corymbia gummifera	Red Bloodwood	N/Id		
EnP	*Darwinia fascicularis subsp. oligantha*		Planted	*	Planted
	Daviesia acicularis	Sandplain Bitter-pea	N/Id		
	Dianella prunina	Native Flax Lily	Planted		
	Dichelachne inaequiglumis	Short-hair Plume Grass		*	
	Dillwynia floribunda	Showy Parrot Pea	Seed bank	*	
	Echinopogon caespitosus	Bushy Hedgehog Grass	N/Id		
	Entolasia marginata	Bordered Panic	Planted		
	Entolasia stricta	Wiry Panic	Seed bank	*	*
	Epacris pulchella	Wallum Heath	Seed bank	*	*
	Eragrostis brownii	Brown's Lovegrass	Seed bank	*	
	Eucalyptus haemastoma	Scribbly Gum	Planted	*	
	Eucalyptus piperita	Sydney Peppermint	N/Id		
	Eucalyptus punctata	Grey Gum		*	*
	Eucalyptus tereticornis	Forest Redgum	Planted		

	Gompholobium grandiflorum	Large Wedge Pea		*	
	Gonocarpus teucrioides	Raspwort	Planted	*	*
	Goodenia hederacea	Forest Goodenia	N/Id	*	*
	Grevillea buxifolia	Grey Spider Flower	Planted	*	*
	Grevillea mocronulata	Green Spider Flower		*	
	Grevillea sericea	Pink Spider Flower	Planted		
	Grevillea speciosa	Red Spider Flower	Planted	*	*
	Hakea sericea	Needlebush	Planted	*	*
	Hardenbergia violacea	False Sarsparilla		*	
	Hibbertia aspera	Rough Guinea Flower	Planted		
	Hibbertia diffusa	Wedge Guinea Flower	Planted		
	Hovea linearis	Common Hovea	Seed bank	*	
W	*Hypochoeris radicata*	Flatweed	Seed bank	*	
	Imperata cylindrica	Blady Grass	Seedbank	*	*
	Isopogon anemonifolius	Broad-leaved Drumsticks	Planted	*	
	Juncus usitatus	Common Rush		*	
	Kunzea capitata	Pink Kunzea	Planted		
	Lambertia formosa	Mountain Devil	Planted	*	*
	Leptospermum trinervium	Flaky-barked Tea-tree	Planted	*	
	Leucopogon juniperinus	Prickly-beard Heath	N/Id		
	Leucopogon microphyllus	Small-leaved White Beard		*	
	Lomandra brevis	Tufted Mat-rush	Seed bank		
	Lomandra glauca	Pale Mat-rush			*
	Lomandra longifolia	Spiny-headed Mat-rush	Planted	*	
	Lomandra obliqua	Fishbones	Seed bank	*	*
	Lomatia silaifolia	Crinkle Bush	Seed bank		
V	*Melaleuca deanei*	Deane's Paperbark	Planted	Planted	Planted
	Melaleuca nodosa	Prickly-leaved Paperbark	N/Id		
	Microlaena stipoides	Weeping Grass	Seed bank		
	Micromyrtus ciliata	Fringed Heath Myrtle		*	
	Mirbelia rubiifolia	Mirbelia	Seed bank	*	*
	Patersonia sericea	Purple Flag Flower	Seed bank		
	Persoonia linearis	Narrow-leaved Geebung	N/Id	*	
	Persoonia pinifolia	Pine-leaved Geebung	Seed bank	*	*
	Petrophile pulchella	Conesticks		*	
	Petrophile sessilis	Prickly Conesticks	Planted		
	Phyllanthus hirtellus	Thyme Spurge	Planted	*	*
	Phyllota phylicoides	Heath Phyllota		*	
	Pimelea linifolia	Slender Rice Flower	Seed bank		
	Platysace linearifolia	Carrot Tops	Seed bank	*	
	Poa affinis	Tussock Grass	N/Id		
	Prostanthera granitica	Granite Mintbush	N/Id		
	Pteridium esculentum	Bracken Fern	Seed bank	*	*
	Rytidosperma racemosum	Wallaby Grass		*	
	Scaevola ramosissima	Purple Fan Flower	Seed bank	*	*
	Stylidium graminifolium	Grass Trigger Plant	Seed bank		
V	*Tetratheca glandulosa*	Glandular Pink Bells		*	

	Tetratheca thymifolia	Black-eyed Susan	N/Id		
	Themeda australis	Kangaroo Grass	Seedbank	*	
	Trema tomentose	Native Peach			*

En – Endangered species
EnP – Endangered Population
V – Vulnerable species
HTW – High Threat Weed
W – Weed species

*N/Id – Planted previously but not identified during this survey

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APPENDIX C – FLORA SPECIES IDENTIFIED AT HRBOA

Status	Botanical Name	Common Name	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5
	Acacia hispidula	Little Harsh Acacia			*		
	Acacia linearifolia	Narrow-leaved Wattle				*	
	Acacia linifolia	White Wattle			*		
	Acacia myrtifolia	Red Stemmed Wattle		*			
	Acacia suaveolens	Sweet Wattle	*	*	*		
	Acacia ulicifolia	Prickly Moses	*		*	*	*
	Actinotus helianthi	Flannel Flower					*
	Actinotus minor	Lesser Flannel Flower	*	*			*
	Allocasuarina distyla	Scrub She-oak		*			
	Allocasuarina littoralis	Black She-oak	*		*	*	*
	Angophora costata	Smooth Barked Apple	*		*	*	
	Angophora hispida	Dwarf Apple	*	*			*
	Aristida vagans	Threeawn Speargrass				*	
	Aristida warburgii	Fine-leafed Wire Grass	*	*	*	*	*
	Asplenium trichomanes	Common Spleenwort		*		*	*
	Austrostipa pubescens	Spear Grass				*	
	Banksia ericifolia	Heath-leaved Banksia		*			*
	Banksia oblongifolia	Fern-leaved Banksia		*			
	Banksia serrata	Old Man Banksia	*	*	*	*	*
	Banksia spinulosa	Hairpin Banksia	*			*	
	Billardiera scandens	Hairy Apple Berry	*	*	*	*	*
	Boronia floribunda	Pale Pink Boronia		*	*	*	*
	Boronia ledifolia	Sydney Boronia	*				*
	Boronia pinnata	Pink Boronia				*	
	Bossiaea hetrophylla	Variable Bossiaea	*				*
	Bossiaea lenticularis	Bossiaea	*		*	*	
	Bossiaea obcordata	Spiny Bossiaea			*	*	
	Bossiaea scolopendra	Sword Bossiaea	*	*			*
	Callicoma serratifolia	Black Wattle				*	
	Calytrix tetragona	Common Fringe Myrtle		*			
	Cassytha glabella	Slender Devils Twine		*			*
	Carex inversa	Knob Sedge					*
	Cassytha glabella	Slender Devils Twine	*				*
	Caustis flexuosa	Curly Wig	*		*	*	*
	Caustis pentandra	Thick Twist Rush		*			
	Ceratopetalum gummiferum	NSW Christmas Bush	*		*	*	
	Cheilanthes seiberi	Mulga Fern		*			
	Corymbia eximia	Yellow Bloodwood			*		
	Corymbia gummifera	Red Bloodwood			*	*	
	Cyathochaeta diandra	Sheath Rush	*	*	*	*	*
	Cymbidium sp	Orchid				*	
V	*Darwinia biflora*			*			
	Dianella caerulea var. producta	Blue Flax Lily			*	*	
	Dianella prunina		*				
	Dillwynia elegans	Parrot Pea					
	Dillwynia floribunda		*				

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	Dillwynia retorta	Parrot Pea		*			*
	Dodonaea viscosa	Sticky Hop Bush			*		
	Dracophyllum secundum	Dracophyllum				*	
	Drosera auriculata	Sundew				*	
	Elaeocarpus reticulatus	Blueberry Ash				*	
	Entolasia stricta	Wiry Panic	*	*	*	*	*
	Epacris microphylla	Coral Heath		*			
	Epacris pulchella	Wallum Heath	*		*		*
	Eriostemon australasius	Pink Wax Flower				*	
	Eucalyptus haemastoma	Scribbly Gum		*			*
	Eucalyptus piperita	Sydney Peppermint			*		
	Eucalyptus punctata	Grey Gum	*		*		*
	Eucalyptus resinifera	Red Mahogony				*	
	Gahnia sieberiana	Red-fruit Saw-sedge				*	
	Gonocarpus teucrioides	Raspwort			*		
	Gompholobium glabratum	Dainty Wedge Pea	*	*			*
	Grevillea buxifolia	Grey Spider Flower	*	*			*
	Grevillea speciosa	Red Spider-flower	*	*	*		*
	Hakea dactyloides	Broad-leaved Hakea		*			*
	Hakea propinqua	Large Fruit Hakea		*			
	Hakea sericea	Needlebush		*		*	
	Hibbertia aspera	Rough Guinea Flower			*	*	
	Hovea linearis	Common Hovea	*		*	*	*
	Imperata cylindrica	Blady Grass					
	Isopogon anemonifolius	Broad-leaved Drumsticks					*
	Kennedia rubicunda		*				
	Lambertia formosa	Mountain Devil	*	*	*	*	*
	Lepidosperma laterale	Variable Swordsedge		*		*	*
	Leptospermum polygalifolium	Tantoon		*			*
	Leptospermum trinervium	Flaky-barked Tea-tree	*	*	*	*	*
	Leucopogon ericoides		*				
	Leucopogon juniperinus	Prickly-beard Heath			*	*	
	Leucopogon microphyllus	Small Leaved White Beard		*			
	Lindsaea microphylla	Lacy Wedge Fern			*		
	Lomandra filiformis	Wattle Mat-rush		*	*		*
	Lomandra glauca	Pale Mat-rush				*	*
	Lomandra gracilis	Small Lomandra			*	*	*
	Lomandra longifolia	Spiny-headed Mat-rush				*	*
	Lomandra multiflora	Many Flowered Mat-rush	*	*	*		*
	Lomandra obliqua	Fish Bones	*	*	*	*	*
	Lomatia silaifolia	Crinkle Bush	*		*	*	*
	Micromyrtus ciliata	Fringed Heath-myrtle					*
	Mirbelia rubiifolia	Heath Mirbelia		*			*
	Patersonia sericea	Purple Flag Flower		*		*	

	Persoonia lanceolate	Lance Leaf Geebung		*			*
	Persoonia levis	Broad Leaved Geebung	*		*	*	*
	Persoonia pinifolia	Pine-leaved Geebung	*	*	*	*	*
	Petrophile pulchella	Conesticks	*	*	*		*
	Phyllanthus hirtellus	Thyme Spurge			*	*	
	Phyllota phylicoides	Heath Phyllota	*	*			*
	Platysace linearifolia	Carrot Tops	*	*	*		*
	Pomax umbellata	Pomax					
	Pratia purpurascens	Whiteroot					*
	Prostanthera howelliae	Mint Bush					*
	Pteridium esculentum	Bracken Fern	*		*	*	
	Rytidosperma racemosum	Wallaby Grass					*
	Scaevola ramosissima	Purple Fan-flower			*		
	Smilax glyciphylla	Sweet Sarsaparilla	*		*	*	
	Stylidium graminifolium	Grass Trigger Plant			*	*	
	Stylidium lineare	Narrow-leaf Trigger Plant			*		
	Telopea speciosissima	NSW Waratah				*	
	Tetratheca thymifolia					*	
	Themeda australis	Kangaroo Grass				*	*
	Xanthorrhoea resinosa	Grass Tree	*	*	*	*	*
	Xanthosia pilosa	Woolly Xanthosia	*			*	*
	Xanthosia tridentata	Rock Xanthosia		*			
	Xylomelum pyriforme	Woody Pear				*	

V – Vulnerable species

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APPENDIX D – FAUNA SPECIES IDENTIFIED WITHIN ONR SURVEY AREA

	Scientific Name	Common name	Method of observation
BIRDS			
	Anthochaera chrysoptera	Little Wattlebird	On site observation
	Aquila audax	Wedge-tailed Eagle	Flying above
V	*Calyptorhynchus lathami*	Glossy Black Cockatoo	Flying above
	Colluricincla harmonica	Grey Shrike-thrush	On site observation
	Corvus coronoides	Australian Raven	Flying above
	Cracticus tibicen	Australian Magpie	On site observation
	Cracticus torquatus	Grey Butcherbird	On site observation
	Dacelo novaeguineae	Laughing Kookaburra	On site observation
	Eopsaltria australis	Eastern Yellow Robin	On site observation
	Lichenostomus leucotis	White-eared Honeyeater	On site observation
	Leucosarcia melanoleuca	Wonga Pigeon	On site observation
	Malurus cyaneus	Superb Fairy Wren	On site observation
P	*Manorina melanocephala*	Noisy Minor	On site observation
	Meliphaga lewinii	Lewin's Honeyeater	On site observation
	Phylidonyris novaehollandiae	New Holland Honeyeater	On Site observation
	Ptilonorhynchus violaceus	Satin Bowerbird	On site observation
	Rhipidura albiscapa	Grey Fantail	On site observation
	Sericornis frontalis	White-browed scrubwren	On site observation
	Strepera graculina	Pied Currawong	On site observation
MAMMALS			
	Canis lupus familiaris	Dog	Sand pad
	Chalinolobus gouldii	Gould's Wattled Bat	AnaBat Express
	Chalinolobus morio	Chocolate Wattled Bat	AnaBat Express
	Felis catus	Domestic Cat	Sand pad
	Perameles nasuta	Long-nosed Bandicoot	Sand pad
	Oryctolagus cuniculus	European Rabbit	Scat/digs
	Rhinolophus megaphyllus	Eastern Horseshoe Bat	AnaBat Express
	Tachyglossus aculeatus	Short-beaked Echidna	Sand pad
	Trichosurus vulpecula	Brush-tailed Possum	Scat
P	*Vulpes vulpes*	European Red Fox	Scat/Sand pad
	Wallabia bicolor	Swamp Wallaby	On site observation/scat/Infra-red camera/Sand pad
AMPHIBIANS			
	Crinia signifera	Common Eastern Froglet	Heard at farm dam
	Litoria peronei	Peron's Tree Frog	Heard in distance
REPTILES			
	Lampropholis guichenoti	Common Garden Skink	On site observation
	Varanus varius	Lace Monitor	Sand pad

V – Vulnerable species
P – Pest species

APPENDIX E – FAUNA SPECIES IDENTIFIED WITHIN HRBOA SURVEY AREA

	Scientific Name	Common name	Method of observation
BIRDS			
	Acanthorhynchus tenuirostris	Eastern Spinebill	On site observation
	Anthochaera chrysoptera	Little Wattlebird	On site observation
V	*Calyptorhynchus lathami*	Glossy Black Cockatoo	Feed tree observed
V	*Climacteris picumnus*	Brown Treecreeper	On site observation
	Colluricincla harmonica	Grey Shrike-thrush	On site observation
	Cracticus tibicen	Australian Magpie	On site observation
	Cracticus torquatus	Grey Butcherbird	On site observation
	Dacelo novaeguineae	Laughing Kookaburra	On site observation
	Eopsaltria australis	Eastern Yellow Robin	On site observation
	Lichenostomus chrysops	Yellow-faced Honeyeater	On site observation
	Lichenostomus leucotis	White-eared Honeyeater	On site observation
	Leucosarcia melanoleuca	Wonga Pigeon	On site observation
	Macropygia Phasianella	Brown Cuckoo-Dove	On site observation
	Malurus cyaneus	Superb Fairy Wren	On site observation
	Meliphaga lewinii	Lewin's Honeyeater	On site observation
	Monarcha melanopsis	Black-faced Monarch	On site observation
	Neochmia temporalis	Red-browed Finch	On site observation
	Pardalotus punctatus	Spotted Pardalote	On site observation
	Phylidonyris novaehollandiae	New Holland Honeyeater	On site observation
	Rhipidura albiscapa	Grey Fantail	On site observation
	Rhipidura leucophrys	Willie Wagtail	On site observation
	Sericornis frontalis	White-browed Scrubwren	On site observation
MAMMALS			
	Canis lupus familiaris	Dog	Print in sand
V	*Chalinolobus dwyeri*	Large-eared Pied Bat	AnaBat Express
	Chalinolobus morio	Chocolate Wattled Bat	AnaBat Express
	Felis catus	Domestic Cat	Print in sand
	Macropus giganteus	Eastern Grey Kangaroo	On site observation
V	*Miniopterus australis*	Little Bent-winged Bat	AnaBat Express
	Myotis adversus	Large-footed Myotis	AnaBat Express
	Trichosurus vulpecula	Brush-tailed Possum	Scat
	Vespadelus darlingtoni	Large Forest Bat	AnaBat Express
	Vespadelus vulturnus	Little Forest Bat	AnaBat Express
	Wallabia bicolor	Swamp Wallaby	On site observation
AMPHIBIANS			
	Crinia signifera	Common Eastern Froglet	Heard in distance
	Limnodynastes dumerilii	Eastern Banjo Frog	Heard in distance
	Litoria peronei	Peron's Tree Frog	Heard in distance
REPTILES			
	Lampropholis guichenoti	Common Garden Skink	On site observation
	Pseudonaja textilis	Eastern Brown Snake	On site observation
GASTROPOD			
E	*Pommerhelix duralensis*	Dural Land Snail	Shell found onsite

E – Endangered species
V – Vulnerable species

APPENDIX F – LANTANA CAMARA MANAGEMENT GUIDE

How to control lantana

Quick reference guide

Lantana – Lantana camara

Minimise spread and future impacts

Although lantana is widespread on the east coast of Australia, it is still absent from parts of its potential range. These areas should be protected by:

- preventing the importation of further varieties and species of lantana
- stopping more planting of lantana in gardens
- strategically controlling infestations which threaten uninfested areas.

A control program for dense infestations in pastures

The Queensland Department of Natural Resources and Mines has produced a pest series fact sheet on lantana (PP#34). They advise that herbicides are too expensive to treat large lantana infestations.

A combination of fire and mechanical control makes spot treatment of small patches with herbicides more cost-effective. The following suggested control program for dense infestations in pastures is based on the fact sheet:

1. Exclude stock to allow a fuel load to build up.
2. Bulldoze, stickrake or plough the infestation to add to the fuel load.
3. Burn the infestation after obtaining a permit. Summer burns are more effective than winter burns.
4. Sow an improved pasture. Seek advice of local council or state/territory government agencies for selection of non-weedy pasture species.
5. Continue stock exclusion until pasture has established and set seed.
6. Burn the infestation again after obtaining a permit.
7. Spot spray or grub out any regrowth or seedlings. Spraying is most effective between summer and autumn.
8. Follow-up burning, spraying and/or grubbing will be required for several years.

Lantana can escape from garden plantings into surrounding bushland.
Photo: Tim Schultz

Control options

Type of infestation	Physical	Mechanical	Chemical	Fire	Biological
Small (few plants, small area)	Hand grubbing only suitable for seedlings. Wear gloves for protection from thorns.	Not suitable.	Spot spray plants less than 2 m in height between summer and autumn with a registered herbicide.	Not suitable.	There are four useful biological control agents. They are already distributed throughout their potential range.
Medium (medium density, medium total area)		Bulldoze, plough, stick-rake or slash infestations. Soil disturbance will lead to mass seed germination, so follow up with further controls. Do not use mechanical control in areas susceptible to erosion. A permit may be required.	Spraying is uneconomical for medium or large infestations. Helicopter spraying is used when there is no access for mechanical control, eg very steep slopes.	Under permit, burn in summer with good fuel load of grass and/or mechanically cleared lantana. Also use as follow-up. Do not burn in rainforests.	
Large (many plants, many ha)					

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CRC Weed management

South East Environmental

South East Environmental

Appendix I – S94 Contribution

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 14/08/2018

Payment Number: eft

Payment Amount: $36,218.77

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
July 2018	00023970	31/07/2018	$36,218.77	$0.00	$0.00	$36,218.77

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 11/09/2018

Payment Number: eft

Payment Amount: $37,581.84

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
August 18	00024170	31/08/2018	$37,581.84	$0.00	$0.00	$37,581.84

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 9/10/2018

Payment Number: eft

Payment Amount: $33,062.98

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
Sept 18	00024308	30/09/2018	$33,062.98	$0.00	$0.00	$33,062.98

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 13/11/2018

Payment Number: eft

Payment Amount: $33,282.77

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
Oct 18	00024529	31/10/2018	$33,282.77	$0.00	$0.00	$33,282.77

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 12/12/2018

Payment Number: eft

Payment Amount: $36,245.51

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
Nov 18	00024708	30/11/2018	$36,245.51	$0.00	$0.00	$36,245.51

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 14/01/2019

Payment Number:	eft
Payment Amount:	$27,449.38

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
Dec 2018	00024856	31/12/2018	$27,449.38	$0.00	$0.00	$27,449.38

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
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The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 12/02/2019

Payment Number: eft

Payment Amount: $24,307.23

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
Jan 19	00024993	31/01/2019	$24,307.23	$0.00	$0.00	$24,307.23

Dixon Sand (Penrith) Pty Ltd

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PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 12/03/2019

Payment Number: eft

Payment Amount: $38,193.35

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
FEBRUARY 2019	00025205	28/02/2019	$38,193.35	$0.00	$0.00	$38,193.35

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 10/04/2019

Payment Number: eft

Payment Amount: $30,391.29

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
March 2019	00025385	31/03/2019	$30,391.29	$0.00	$0.00	$30,391.29

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 13/05/2019

Payment Number: eft

Payment Amount: $28,353.07

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
April 19	00025493	30/04/2019	$28,353.07	$0.00	$0.00	$28,353.07

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 12/06/2019

Payment Number: eft

Payment Amount: $32,486.93

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
May 2019	00025720	31/05/2019	$32,486.93	$0.00	$0.00	$32,486.93

Dixon Sand (Penrith) Pty Ltd

PO Box 4019
PITT TOWN NSW 2756

The Hills Shire Council
P.O. Box 7064
BAULKHAM HILLS BC 2153

REMITTANCE ADVICE

Date: 9/07/2019

Payment Number: eft

Payment Amount: $24,532.46

Payment; The Hills Shire Council

In Payment For:

SUPPLIER INV.	PURCHASE NO.	INVOICE DATE	INVOICE AMOUNT	DISCOUNTS	PREVIOUS PAYMENTS	CURRENT PAYMENT
June 2019	00025849	30/06/2019	$24,532.46	$0.00	$0.00	$24,532.46

Appendix J – Community Engagement and CCC Meeting Minutes

Dixon Sand (Penrith) Pty Ltd

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE 4610 Old Northern Road 1.00pm – 20th November 2018

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative
	Chris Spraggon (CS)	Bush Regeneration Contractor (Bush-It)
	Robert Buckham (RB)	The Hills Shire Council Representative
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	David Dixon (DD)	General Manager, Dixon Sand
APOLOGIES	Lisa Aylward	Maroota Public School Representative
	Farley Roberts	Community Representative
	Jemma Roberts (JR)	Community Representative (alternate)

Lunch was provided for CCC members 12.30pm-1pm.

The CCC meeting was opened at 12.55pm

WELCOME	The chair welcomed all present and thanked them for their attendance.	
DECLARATION OF INTEREST	LA declared that she is approved by the Department of Planning and Environment to chair the meeting and engaged by Dixon Sand.	**No changes to previous declarations by members.**
BUSINESS ARISING	In accordance with the guidelines, the previous minutes from 8th May 2018 were finalised and emailed to members on 24th May 2018.	**Action Item:** Nil.
CORRESPONDENCE (as emailed with Meeting Notice on 22/10/18)	• 8/5/18 - Email from HC with a list of Old Northern Road's management plans, now available on the project website. Forwarded on to members. • 8/6/18 – Email from HC advising that the Old Northern Road Soil and Water Management Plan (SWMP) had been approved by the Department of Planning and Environment on 7th June 2018. Forwarded on to members. • 29/9/18 – Email from HC with the annual review link for the Old Northern Road and Haerses Road quarries. Forwarded on to members. • 22/10/18 – Email to CCC members with the Meeting Notice, Agenda and Correspondence Report for this meeting. • 24/10/18 – Email from Lisa Aylward with an apology for this meeting. • 29/10/18 - Email from HC to Lisa Aylward asking if there is anything that she wishes to raise at the CCC on behalf of the school and/or parents.	

PROJECT REPORT	HC provided the CCC with a comprehensive presentation (see separate addendum).
	Operations & Progress
	Production/Sales – DD advised:
	• That production is slightly down this year, which was deliberate to enable repairs and maintenance to be undertaken.
	• This year sales were 440kt, with last year being 483kt.
	• They are currently preparing 4 further siltation ponds.
	• The siltation ponds and reclamation of ponds is ongoing.
	• The product is at a fixed rate in the market.
	• Hope to commission a new processing plant at Hearses Road.
	DRE Improvement Notification
	• The Resource Regulator visited the site in May and provided 'improvement notices' on some safety issues (hand rails, etc), new staff training.
	Old Northern Road Quarry
	• Sampling at SW19 has recommenced.
	Hearses Road Quarry MOD 1
	• Pre-commencement actions have occurred:
	  ○ Road Intersection upgrade – at tender stage.
	  ○ Groundwater bores in the MTSGS 100m buffer have been installed.
	  ○ Data loggers for groundwater levels have been put in.
	  ○ Fencing and survey works. A lot of time has been spent in undertaking these works.
	Environmental Monitoring Results
	• Location maps were provided to all attendees to show new locations of noise, groundwater, TEOMs and different receivers (R6, R8, R4, R3 & R1).
	• These plans have been extracted from the relevant Management Plans.
	• TEOMs are calibrated every three months throughout the year.
	• Dust Deposition -There are 6 depositional dust gauges plus 2 additional ones at Hearses Road.
	• D10 was high due to some clearing working being undertaken from another property.
	• Noise – all monitoring results demonstrated compliance.
	• Groundwater & Surface water – 2 years of data is required for groundwater monitoring interaction between the bores representing different aquifers within the 100m buffer zone to the MTSGS.
	• KM enquired how much water was taken out to sample. The process was explained, including the removal of stagnant water to get the recharge correct rate. For example, approximately 48 litres of water is required to be pumped out to achieve a constant flow for recharged water for sampling in BH06A
	• There have been no discharges from the site for 2 years due to drought conditions.
		Questions were asked and answered throughout the presentation.

REHABILITATION	CS provided a briefing of activities occurring on site:
	• Native Vegetation Corridor works:
	  o Rapid rehabilitation is occurring with many species flowering.
	  o Doing very well, especially where soil was moved in, which has accelerated growth.
	  o The water cart has been modified to allow for spraying out of the care to reach the plants.
	  o Not all planted seeds, some have blown in.
	  o A few canopy trees were lost due to being root bound in nursery pots.
	  o Lantana has been removed.
	  o There is Whiskey Grass and Crofton Weed closer to the creek lines, but this is being kept under control.
	• Before and after photographs were shown of the Western Vegetation and Eastern Woodland as well as Hearses Road Rehabilitation and the Embankment Rehabilitation.
	• The Embankment work at the entrance to the quarry has been rehabilitated from seed stock contained in the materials used to dress the embankment and supplementary plantings from taking cuttings from the nursery.
	• The new area and Hearses Road – Biobanking plan is still with OEH at the negotiation and finalisation stage. Hopefully this will be available for presentation at the next meeting.	

GENERAL BUSINESS	• HC advised of the proposed Community Relations Plan early next year. An advertisement will be placed in the paper for the public's information. Information will also be provided to the school. • Hoping to arrange site tours (no children) to invite people to see the operations on "Quarry Open Day" • DD distributed a Community Information Sheet to all attendees, informing members of Dixon Sand's proposal to seek development consent to establish a new sand quarry on an area of land immediately adjacent to its Old Northern Road Quarry in Maroota. DD advised that he wanted the CCC to know prior to this information being distributed to the community. • DD further advised that agreements have been reached with the land owners. • The proposed quarry will be a "stand-alone" site and not integrated with the current operations. • Umwelt have been engaged to carry out the Ecological Assessment. • PS raised concern with Council's LEP process for rezoning properties to allow subdivision of land in the area, stating that it should be recognised for its resource (REP9). By subdividing the properties it puts pressure on power, water, traffic, etc. • KM advised the CCC that new contributions have come into place two weeks ago. The	**LA thanked DD for advising the CCC.**

	contributions plans will be updated every five years. • There have been no real changes, just updates to incorporate new sections of the Act and the new works programs inserted.	
MEETING SCHEDULE FOR 2019	It was agreed that the meeting schedule would remain bi-annually as per 2018, Tuesday 14th May and Tuesday 19th November 2019 commencing at 1pm (on site). (Luncheon from 12.30pm.)	

Meeting closed at 2.24pm with LA thanking all CCC members for their attendance and contribution through 2018 and wishing them a Merry Christmas and Happy New Year.

ACTION ITEMS - NIL

Dixon Sand (Penrith) Pty Ltd

umwelt
Environmental & Social Consultants

Community Information Sheet Nov 2018

Dixon Sand Pty Ltd - Old Northern Road Quarry 2 (ONR-2) Proposal, Maroota NSW

Dixon Sand is a family owned and operated business since 1955. Dixon Sand has extensive local quarrying experience, having quarried speciality sand, concrete sand and sandstone products from the Old Northern Road Quarry and Haerses Road Quarry for over two decades.

Dixon Sand recognises that genuine partnerships with our local communities are an essential part of our business success. We are committed to developing and maintaining long-term relationships with all stakeholders by communicating openly, honestly and in a transparent manner.

What is Proposed?

To meet increasing demand for construction sand in the Sydney region, Dixon Sand intends to seek development consent to establish a new sand quarry (the Project) on an area of land immediately adjacent to its Old Northern Road Quarry in Maroota NSW (refer to **Figure 1**).

The Project, while still in the planning stages, is proposed to produce up to 350,000 tonnes per annum of sand products. New processing plant will be established at the Quarry and sand will be dispatched by truck via the existing Old Northern Road Quarry access road and intersection. The Project will generate approximately 30 laden truck movements (60 truck movements) per day.

The following are the key components of the Site. The locations of each are to be determined as part of the environmental assessment process.

- An extraction area.
- Internal haul roads.
- Mobile processing plant.
- Product, topsoil and overburden stockpiling areas.
- Ancillary facilities including weighbridge, workshop, office and staff amenities.
- Progressive re-filling and rehabilitation of the quarry void consistent with the surrounding landform.

The hours of operation will be the same as for Old Northern Road Quarry, with quarrying and processing to occur between 7.00am and 6.00pm Monday to Saturday, and truck loading and dispatch to occur between 6.00am and 6.00pm Monday to Saturday.

The rural residences and agricultural activities located on the eastern portion of the Site will be retained by the existing landowners. A significant portion of vegetated areas of the Site are to be retained as a biodiversity offset. The quarry void will be progressively backfilled and rehabilitated to create a landform sympathetic to the surrounding environment and returned to grazing land.

Alternatives Considered

Dixon Sand has considered a number of alternatives in response to growing market demand for specialty sand products.

An increase in production at the existing Old Northern Road Quarry has been considered, however, this quarry is currently operating at capacity and therefore unable to increase production.

Doing nothing was not considered desirable as it would not allow Dixon Sand to increase the supply of sand products to meet the current and projected future demand. The Environmental Impact Statement (EIS) will aim to demonstrate that through appropriate site selection and careful project design, the Project can be developed with an acceptable level of impact and is consistent with the principles of ecologically sustainable development.

Strategic Planning Context

The Project is classed as State Significant Development under the *State Environmental Planning Policy (State and Regional Development) 2011*. The Project is permissible with development consent under the current land zoning and therefore approval under Part 4 of the *Environmental Planning and Assessment Act 1979* is required. An application will be made to the NSW Minister for Planning, who is the consent authority for the Project.

Matters for Consideration in the EIS

Based on initial scoping of the Project, key matters for assessment have been identified as follows:

- Impacts of air and noise emissions.
- Increased traffic on local roads.
- Vegetation clearing and impacts on biodiversity and heritage matters.
- Visual amenity impacts.
- Changes to surface and groundwater systems.
- Modifications to local landforms and land uses.
- Socio-economic factors.

Stakeholder Feedback

Dixon Sand is seeking community and stakeholder perspectives on matters to be addressed in the EIS. This could include environmental, economic or social matters you consider important and relevant to the assessment of the Project. We welcome your input on any relevant matters or local knowledge that you believe should be considered.

Information gathered through this process will be collated in a Scoping Report which will be submitted to the Department of Planning and Environment and will guide the department's preparation of Secretary's Environmental Assessment Requirements for the Project. A comprehensive EIS and Community and Stakeholder Engagement Plan will then be prepared and there will be further opportunities for community and stakeholder comment prior to the department's determination of the Project.

How to Provide your Feedback

Dixon Sand invites you to provide feedback via email or phone to David Dixon (Dixon Sand) or Alex Irwin (Umwelt) on the contact details provided below. Alternatively, if you would like to meet with Dixon Sand to discuss the Project in more detail, please contact David Dixon or Hunny Churcher.

We look forward to your input.

Further Information

David Dixon

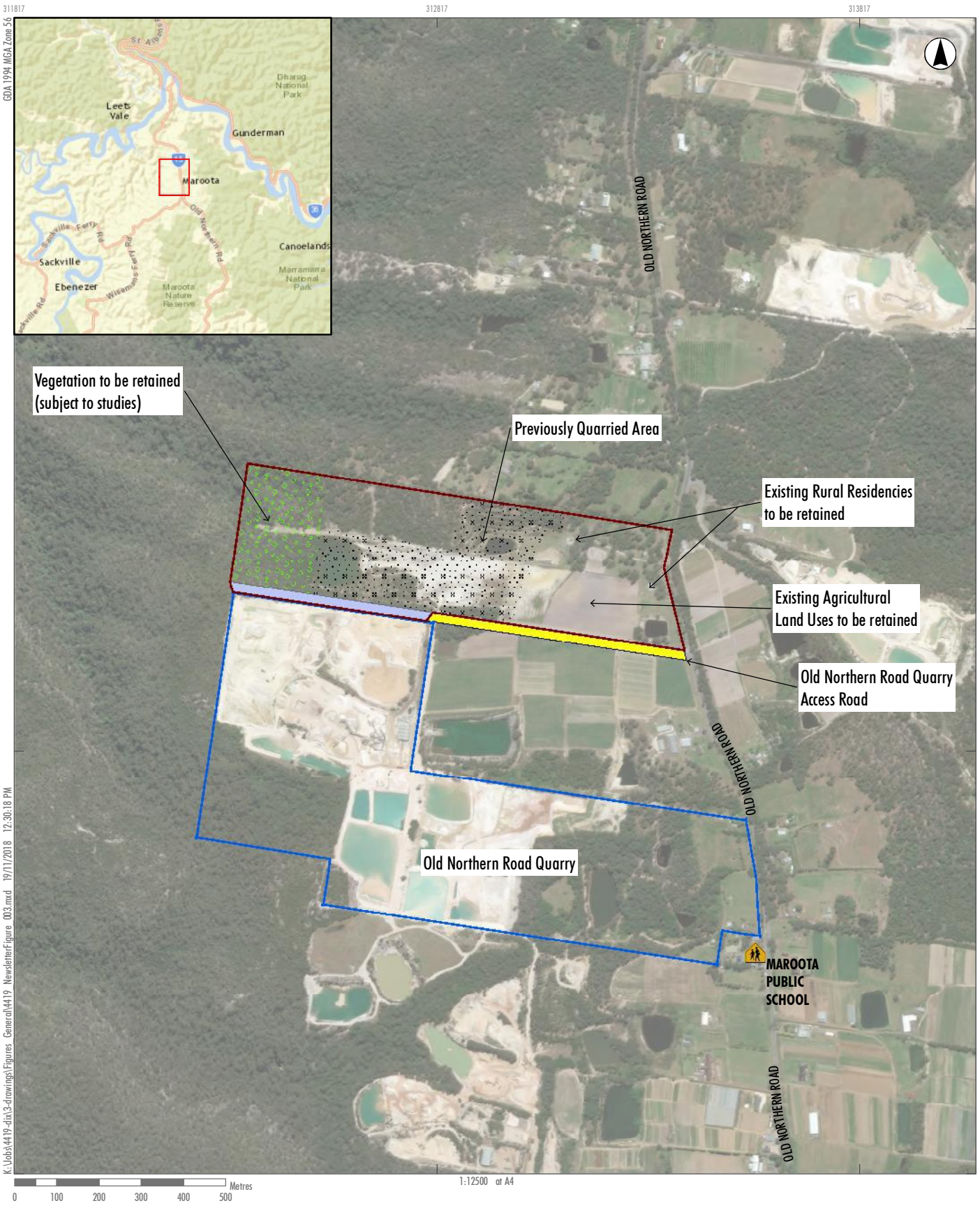
Dixon Sand Pty Ltd
Email: david@dixonsand.com.au
Ph: 0414 330 490

Alex Irwin

Umwelt (Australia) Pty Ltd
Email: airwin@umwelt.com.au
Ph: (02) 4950 5322

Hunny Churcher

Dixon Sand Pty Ltd
Email: environment@dixonsand.com.au
Ph: 02 45 666 348



Legend

- Maroota Public School
- Project Site (layout to be confirmed as part of Environmental Assessment process)
- Project Access (shared with existing Old Northern Road Quarry)
- Crown Land
- Existing Old Northern Road Quarry
- Retained Vegetation (Subject to Studies)
- Previously Quarried Area

FIGURE 1

The Project Site

Note:

Image Source: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community Data source: Umwelt (2018)

Dixon Sand (Penrith) Pty Ltd

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE 4610 Old Northern Road 1.00pm – 14th May 2019

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	Chris Spraggon (CS)	Bush Regeneration Contractor (Bush-It)
	Daniel Giffney (DG)	The Hills Shire Council Representative
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	David Dixon (DD)	General Manager, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
APOLOGIES	Farley Roberts	Community Representative
	Jemma Roberts	Community Representative (alternate)

Lunch was provided for CCC members 12.30pm-1pm.

The CCC meeting was opened at 12.52pm

WELCOME	The chair welcomed all present and thanked them for their attendance.	
DECLARATION OF INTEREST	LA declared that she is approved by the Department of Planning and Environment to chair the meeting and engaged by Dixon Sand.	**No changes to previous declarations by members.**
BUSINESS ARISING	In accordance with the guidelines, the previous minutes from 20th November 2018 were finalised and emailed to members on 8th December 2018. • The Biobanking Agreements for Hearses Road and Porters Road biobank sites have been approved by OEH and are with Land Registry Services for registration. • Extraction areas are as approval. • Pre-commencement conditions are proceeding with intersection works to Hearses Rd starting next month. • Groundwater monitoring bores and data loggers for buffer zones have been installed. A minimum of 24 months of data is required (commencing from August 2018) and proof that no impacts on regional groundwater is required prior to extraction in the buffer zone.	**Nil action items.**
CORRESPONDENCE (as emailed with Meeting Notice on 17/4/19, with 2 additional items)	• 30/11/18 - Draft minutes sent to members for review • 8/12/18 - Finalised minutes sent to members. • 6/2/19- Email from HC advising that Modification 2 has been approved by DPE with a link to the document.	

	• 16/4/19 – Email to CCC members from) HC providing the Haerses Road Quarry DA 165-7-2005 Modification 3 - Community Flyer. • 17/4/19 – Email to CCC members with the Meeting Notice, Agenda for this meeting. • 6/5/19 – Email from Farley Roberts with an apology for he and Jemma & seeking a change to the meeting day. (Listed for discussion in the "Next Meeting" agenda item. • 10/5/19 - Email to CCC members with reminder for this meeting.	
PROPOSED HEARSES ROAD QUARRY MODIFICATION 3	DD provided an update: • Currently approved for 250kt p/yr and proposed to increase extraction to 495kt p/yr. • There is approximately 21Mt of resources available on site. • Importation of VENM is currently approved for 100kt p/yr and looking at increasing to 250kt p/yr to allow for proper rehabilitation of the site corresponding to the proposed increased extraction rates • There are 28 traffic movements per day (28 inbound and 28 outbound), which will increase to 90 movements per day. • Flyers have been distributed to the community and seven residents have contacted Dixon Sand. Some requesting additional information with three expressing strong objections. Raising concerns with increased truck numbers, exhaust brakes, speed and dangerous driving. These issues will be addressed in the environmental assessment for the development application. PS tabled an email received by her from a concerned resident regarding the proposed modification. PS read the issues raised and DD responded: 1. Traffic – increase by 3 fold, safety, volume, air brakes, etc. 2. Hours of Operation 3. Checks and Balances (monitoring, compliance, exceedances, etc) 4. Buffer Zone encroachment 5. Scarring of the landscape 6. Suggestion of CCTV cameras to monitor traffic 7. Health concerns (silica dust) 8. Ground Water Impacts. LA stated that these are genuine concerns and consistent with issues raised in extractive developments. LA suggested that Dixon Sand consider preparing a Fact Sheet and General Questions and Answers, addressing these common issues and distributing to local community and placing on the project website. **1 Traffic** – whilst truck movements are proposed to increase, a significant proportion of the increase in trucks at Hearses Rd, will be required to satisfy local loads and smaller axle trucks using the site. DD said that this was observed at Dixon Sand Old Northern Rd Quarry (also approved for 90 movements) where additional movements are needed to cater for smaller trucks and local loads. In addition movements are typically split 50:50 between Old Northern Road and Wisemans Ferry Road and so truck movements will be dispersed rather than concentrated across traffic routes. Dixon Sand has a strict Drivers Code of Conduct (three strikes	**See attached document.** **Agreed. Dixon Sand to produce Fact Sheet on proposed Modification & uploaded to the project website.** **Action: HC to send LA the link, once uploaded.**

	and you are out policy) together with enforcement through inter-pit policy (PF Formation and Hodgson Quarries). Dixon Sand has no legal jurisdiction to direct trucks not to use air brakes due to safety requirements, however, will encourage drivers to limit where possible and drive to the road conditions. DD has undertaken extensive research on this issue. All community members are urged to report any driver safety issues for investigation and action. Dixon Sand will be investigating further traffic management solutions as part of the current Mod 3 application to eliminate 'rogue' and repeat offending drivers as well as improve management controls. **2 Hours of Operation** The site operations commence at 6am and drivers are encouraged not to arrive before this time. Dixon Sand cannot restrict trucks from using arterial roads during certain times of the day. **3 Checks & Balances** There is a stringent process for compliance monitoring (DP&E, EPA, Council, etc). Traffic monitoring, 3 year Independent Environmental Review, Annual Reports, inspections by compliance department from government authorities. **4 Buffer Zones** Properties adjacent to the existing buffer zones have been purchased by Dixon Sand, therefore buffering onto previous private properties is no longer required. Removal of 100m buffer zone to 1725 Wisemans Ferry Road is subject to the landowner consent and agreement. **5 Scarring of Landscape** Bunds will be constructed to protect and shield mining operations. **6 CCTV** Cameras are already installed and monitoring of entry and exit to and from the site is undertaken. **7 Health Concerns** Silicosis only occurs when there is a high impact on the sand particle. All staff and working environment are monitored and tested on a regular basis to industry health standards, as part of the OH&S requirements. DD has been on site for 30 years and testing to date has shown that his lungs have not been affected by repeated exposure to sand mining. Operators of bulldozers and high speed crushers would potentially be the most impacted, however, appropriate PPE gear is worn to protect from any harm. **8 Impacts on Ground Water** There are multiple bores on site and around Maroota with 30 years of data available. The location of the water table is known and there is no encroachment into the regional ground water resource. It should be noted that all properties in this area are identified under State Regional Environmental Planning Policy No. 9 (SREP No.9) due to the quality of the sand in the area and the demand for the resource. DG asked if Dixon Sand operate a chain of custody with legislative requirements. DD confirmed that no trucks leave the site overloaded.	
PROPOSED OLD NORTHERN ROAD QUARRY No. 2	• The site is still subjected to rehabilitation requirement from the development consent held by the previous operator.	

	• Diversion drain needs to be installed to satisfy the rehabilitation consent condition.	
PROJECT REPORT & ENVIRONMENTAL MONITORING RESULTS	See attached presentation. HC provided results of the environmental monitoring program: o Locations o TEMO- PM10 results o Dust deposition results o Noise results o Groundwater and surface water data.	**Questions were asked and answered throughout the presentation.**
REHABILITATION	CS provided an update on the rehabilitation program. Old Northern Road: • The native corridor is looking very good. • Starting to hold its own moisture. • Should be able to remove the protection guards soon, which was put in place to shield the vegetation from the wallabies. • The water cart was modified to water the native vegetation corridor. This together with hand watering has enabled good growth. • Targeting Lantana around the old orchard areas of Lots 1 and 2. Haerses Road • Great progress of rehabilitation and maintenance of the original offset area.	**Photographs were shown in the presentation depicting the success of the rehabilitation works.**
GENERAL BUSINESS	Nil.	
NEXT MEETING	Following representations from Farley and Jemma Robert to move the meeting days to either a Monday, Wednesday or Friday to enable them to attend. It was agreed to change from Tuesday to Wednesday moving forward. Accordingly the meeting previously set down for 19th November 2019 was moved to **Wednesday 20th November 2019** commencing at 1pm (on site). (Luncheon from 12.30pm.)	**Agreed.**

Meeting closed at 2.39pm with LA thanking all CCC members for their attendance.

ACTION ITEMS

1 HC to send link to Fact Sheet once prepared and uploaded to website.

Dixon Sand (Penrith) Pty Ltd

umwelt
Environmental & Social Consultants

Community Information Sheet - for a Proposed Modification to Operations at the Dixon Sand Haerses Road Quarry, Maroota, NSW - April 2019

Background

Dixon Sand Pty Ltd (Dixon Sand) currently operate the Haerses Road Quarry, extracting and processing sand to supply concrete and specialty sand products to the Sydney metropolitan market. The Quarry Site is approximately 128 hectares (ha) and includes various parcels of land which adjoin Haerses Road, a no through road providing access to the nominated lots of the Quarry.

Under the conditions of the existing development consent, Dixon Sand has approval to extract up to 250,000 tonnes annually until February 2046. **Figure A** identifies the Quarry Site boundary, as well as the areas of approved extraction which are limited by buffers retained to surrounding properties.

As a result of the continued and growing demand for sand products for use in construction within the greater Sydney metropolitan area, Dixon Sand has identified the need to increase annual extraction rates to supply this demand. Dixon Sand will be making an application to the Department of Planning & Environment (DPE) to modify the development consent to allow for these increases.

What is Proposed?

The following provides further detail on the proposed increase to extraction rates, along with additional modifications proposed to compliment these increases.

Extraction Rate Increase

The proposed modification seeks to increase the annual rate of extraction to 495,000 tonnes. The increase would better reflect the approved resource available for extraction which includes the additional 15 million tonnes of resource approved through modification to the development consent in 2018. A complimentary increase in the importation of clean fill for rehabilitation/reprocessing from 100,000 to 250,000 tonnes annually would ensure the construction and rehabilitation of the approved final landform over the term of the Quarry operation (until 2046).

Increase to Traffic Movements

An increase in the number of daily truck movements from 28 to 90 trucks per day (90 inbound, 90 outbound) is proposed. This will accommodate the proposed increased extraction rate and corresponding increase in direct sales to the local and regional market, including a number of smaller local trucks buying direct from site.

Dixon Sand will upgrade the intersection with Wisemans Ferry Rd and Haerses Road to facilitate this increase in truck movements and provide for a safer intersection in accordance with RMS design requirements.

Extraction Area Extension / Buffer Modification

The extraction area is currently limited by various buffers to surrounding properties, roads and other features (refer to Figure A). Dixon Sand proposes a minor extension of the extraction area of approximately 1 hectare between the approved extraction area and Wisemans Ferry Road, in accordance with design guidelines.

No changes to on-site operations or hours of operation are proposed, with quarrying and processing to occur between 7.00am and 6.00pm Monday to Saturday, and truck loading and dispatch to occur between 6.00am and 6.00pm Monday to Saturday.

The Planning Process

DA 165-7-2005 is classed as State Significant Development under the *State Environmental Planning Policy (State and Regional Development) 2011*. As the Quarry will remain substantially the same as that originally approved in 2006, an application to modify the development consent will be made to the DPE under Section 4.55(2) of the *Environmental Planning and Assessment Act 1979*.

Dixon Sand will prepare an application, including a Statement of Environmental Effects, to be lodged with the DPE. The Statement of Environmental Effects, which is being prepared by Umwelt (Australia) Pty Limited (Umwelt), will address those environmental issues that could or would be affected by the proposed modification to operations. Based on a preliminary assessment of impacts, and consultation with the DPE, key matters for assessment have been identified as follows.

- Impacts of air and noise emissions.
- Increased traffic on local roads.
- Changes to surface water systems.
- Modifications to local landforms and land uses.

Your Involvement

Dixon Sand seeks community perspectives on matters to be addressed in the Statement of Environmental Effects. This could include environmental, economic or social matters you consider important and relevant to the assessment of the proposed modification. We welcome your input on any relevant matters or local knowledge that you believe should be considered.

Please direct any comments or feedback as follows:

David Dixon	**Ruth Tapp**	**Hunny Churcher**
Dixon Sand Pty Ltd	Umwelt (Australia) Pty Ltd	Dixon Sand Pty Ltd
Email: david@dixonsand.com.au	Email: rtapp@umwelt.com.au	Email: environment@dixonsand.com.au
Ph: 0414 330 490	Ph: (02) 4950 5322	Ph: 02 45 666 348

Information gathered will be collated and considered as part of the Statement of Environmental Effects. Once completed, an opportunity will be provided to you to review and comment on the assessment and raise concerns, request additional information or indicate support.

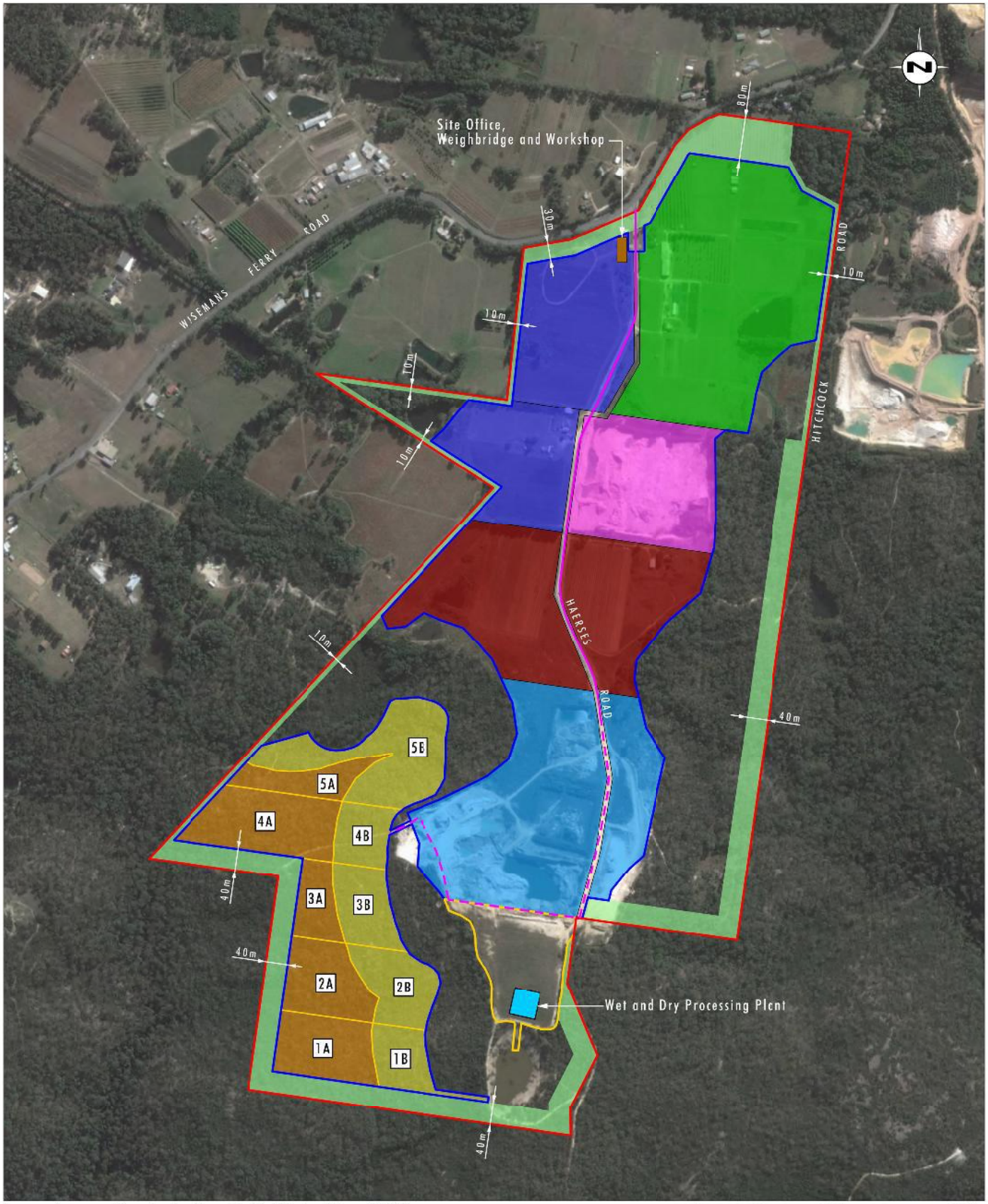


Image Source: Google Earth - DigitalGlobe (May 2016)
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0 100 250 500m

Legend

- Quarry
- Buffer
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FIGURE A

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2C190404

Appendix K – Complaint and Community Liaison Registers

Old Northern Road Quarry - Complaints

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 July 2018	0	8 August 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 August 2018	0	6 September 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 Sep 2018	0	2 October 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Oct 2018	0	14 Nov 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 Nov 2018	0	4 Dec 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Dec 2018	0	7 Jan 2019

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Jan 2019	0	01 Feb 2019

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 28 February 2019	2	04 March 2019

Date Received	Contact Methodology	Dixon Staff Contacted	Issue	Recommended Action(s)	Date Actioned	Outcome / Future Action	Closed Out Date
Mid – February 2019	Phone call	Tom Watson	The complainant said they wanted us to know a truck had crossed over double lines along Wisemans Ferry Road. No accident or 'near miss' occurred. The complainant could not provide details such as registration or any identification marks. The complainant also said they did not know if the truck had come from a quarry and if so which quarry but wanted us to know about it. The complainant also contacted PF Formation about the matter	As it is impossible to identify the truck involved no action is possible apart from the quarry's normal on-going activities which include: 1) During inductions drivers are advised they must drive in a safe and legal manner 2) Signage on weighbridge advising the same 3) When an issue arises, reminding drivers of their responsibilities and possible consequences of non-compliance including being banned from this quarry and possible banning from all quarries in the area.	Mid - February	No further action required	01/03/19
26/02/2019	Phone call	Tom Watson	The property owner adjacent to the Old Northern Road quarry rang to say that 2 drivers had exceeded the speed limit 20km/hr along the access road of the quarry.	Remind all drivers they must not exceed the speed limit along the access road. Provide explanation to the drivers the reasoning behind the speed limit of 20km/hr i.e. safety, health issues associated with dust as well as dust affecting adjacent tomato crop.	26/02/19	The weighbridge operator cautioned all drivers driving on the day and reminded them the speed limit is to be adhered to. In addition, signage is displayed with this message which is visible to all drivers at the weighbridge office.	26/02/19

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 March 2019	1	02 April 2019

Date Received	Contact Methodology	Dixon Staff Contacted	Issue	Recommended Action(s)	Date Actioned	Outcome / Future Action	Closed Out Date
19th March 2019	Phone call	Tom Watson	The Complainant said that a truck was tailgating cars along Wisemans Ferry Road and provided the registration number. No other identification of the truck was provided.	Dixon Sand's weighbridge dockets for today were checked and the truck did not pick up from the quarry. Also checked Dixon Sand's registration database and there is no truck with the registration listed. Suggest Dixon Sand's management is informed and they decide on appropriate action. Management to contact other quarries whom are signatories of the Maroota Local Traffic Management to determine if the truck is associated with the quarries in the area.	26th March 2019	Management contacted PF Formation and Hodgson Quarries whom confirmed that the truck in question is not a customer from their quarry. Concluded that the truck in question is not associated with the Sand quarries under the Maroota Local Traffic Management	Action completed and complaint closed out on 26/03/2019

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 April 2019	0	07 May 2019

Dixon Sand Pty Ltd

Old Northern Road Quarry

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 May 2019	1	04 June 2019

Date Received	Contact Methodology	Dixon Staff Contacted	Issue	Recommended Action(s)	Date Actioned	Outcome / Future Action	Closed Out Date
1st May 2019	Phone Call	Tom Watson	The Complainant said a truck which turned into Dixon Sand's quarry in the last 5 minutes had tailgated a car forcing the car driver to leave the road. In addition, the truck had exceeded the speed limit. The truck registration was provided. The Complainant preferred not to disclose their contact details despite being explained that Dixon Sand would make contact to provide feedback on the actions taken following the complaint.	To inform the Quarry Manager of the issue. To re-enforce the driver the requirements of the Traffic Management Plan and policies.	1st May 2019	The Quarry Manager spoke to the truck driver who admitted to not leaving enough distance between the car. The truck driver was informed that any other breach would not be tolerated and consequences through the inter-pit policy. The weighbridge operator re-iterated the quarry's traffic management plan and policies. Continue to monitor.	31st May 2019

Dixon Sand Pty Ltd

Old Northern Road Quarry

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 June 2019	1	16 July 2019

Date Received	Contact Methodology	Dixon Staff Contacted	Issue	Recommended Action(s)	Date Actioned	Outcome / Future Action	Closed Out Date
28th June 2019	Face-to-face	Tom Watson	Thursday 27th June 2019 6:30am - The complainant (Michael Munnoch – Dixon Sand's Quarry Manager) asked Tom Watson to note that the Lantrak Truck (registration CN-93-LO) had used engine brakes excessively resulting in excessive noise in the Maroota area.	Friday 28th June 2019 8:00am - Tom passed on the information to Hunny Churcher (Enviro Officer) whom discussed the issue with David Dixon. 10:30am - David asked Tom to contact Lantrak requesting their management team to speak to their driver and to advice them to limit the use of engine brakes.	28th June 2019	10:40am – Tom Rung Lantrak (13 96 66) and spoke to a lady named Sandra. Sandra confirmed that the truck in question had picked up from the quarry yesterday morning. Sandra said she could not assist and provided Tom with the driver's manager – Pierre 0433 582 960. 10:45am – Tom rung Pierre – no answer and the call eventually dropped out. Will try again later. 11:14am – Tom rung Pierre again – he answered and Tom explained the above. Pierre apologized and said he would ring the driver and caution him to limit the use of his engine brakes	28th June 2019

Haerses Road Quarry - Complaints

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 July 2018	0	8 August 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 August 2018	0	6 September 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 Sep 2018	0	2 October 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Oct 2018	0	14 Nov 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 Nov 2018	0	4 Dec 2018

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Dec 2018	0	7 Jan 2019

Dixon Sand (Penrith) P/L Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 Jan 2019	0	01 Feb 2019

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 28 February 2019	0	04 March 2019

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 March 2019	0	02 April 2019

Dixon Sand Pty Ltd

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 April 2019	0	07 May 2019

Dixon Sand (No. 1) Pty Ltd

Haerses Road Quarry

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 31 May 2019	1	04 June 2019

Dixon Sand (No. 1) Pty Ltd - Complaints Register

Date Received	**01/05/2019**	**Time**	**8:15 am**	**Complaint Received By**	**David Dixon**
Contact Methodology	**Email**	**Complaint Nature**	**Traffic – exhaust/engine break**		

Issue(s) raised

Complainant claimed that:

on 01/05/2019

Point 1 "a black T&D with GPH or GRH in red on the side of both units who would have departed the quarry area approx 07:25 used engine braking for approx 8 seconds",

Point 2 "a red T&D Kenworth T908 (no livery) on the way to the quarry I could hear the truck under light load for approx 2km and upon return (left the quarry area approx 07:45) used engine braking for approx 8 seconds", and

Point 3 "one of the CEF guys uses his engine brake loaded or empty as does one of the Parklea guys (loaded only) but impossible to tell which one it is from a distance".

On 02/05/2019

Point 4 "noted 20+ trucks all using engine breaks for extended periods of time". No specific truck identification such as registration plate, truck type, colour or company branding/signage were provided.

Recommendation(s)

Investigate if the trucks fitting the descriptions picked up from Dixon Sand or the other two quarries whom are signatories of the Maroota Local Traffic Management Plan (Inter-pit Policy).

Outcome / Action(s) / Future Action(s)

Dixon Sand had recently issued the "Announcement: Truck Driver's Code of Conduct and Traffic Policies" to the truck drivers, reminding them of their responsibilities under Dixon Sand's traffic policies and highlighting important requirements. Refer to the attachment.

Outcome – replied the Complainant on 01/05/2019

Point 1 The GPH or GRH truck is most likely a CBH truck which picked up from Dixon Sand Quarry. The truck driver was immediately reminded of their obligations under the quarry's traffic management policies.

Point 2 The "red T&D Kenworth T908 (no livery)" truck did not pick up from Dixon Sand.

Point 3 Will attempt to find out whom the other trucks two trucks picked up from.

Outcome – replied the Complainant on 28/05/2019

Point 3 Dixon Sand contacted the other quarries whom are signatories of the inter-pit policy and confirm that the CEF truck did not pick up from any of the quarries on 01/05/2019. David Dixon contacted management of the truck company whom confirmed that the CEF trucks do not exclusively transport quarry materials in the area. The truck company is reminded of Dixon Sand's Traffic Management Policy and is committed to request their drivers to limit the use of exhaust breaks.

Closed Out Date	28/05/2019	**Closed Out By**	David Dixon & Hunny Churcher

Dixon Sand (No. 1) Pty Ltd

Haerses Road Quarry

Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
01 – 30 June 2019	1	22 July 2019

Dixon Sand (No. 1) Pty Ltd - Complaints Register

Date Received	**19/06/2019**	**Time**	**4:42 PM**	**Complaint Received By**	**Hunny Churcher**
Contact Methodology	**Email**	**Complaint Nature**	**Traffic – exhaust/engine break**		
Issue(s) raised					
Follow up complaint (on-going) Complainant claimed that: • The same truck in question had reverted to using compression braking again only a few weeks after previously having been warned. • There is still a large volume of trucks speeding, driving over centre lines, driving off the verge, and using their compression brakes without reason or cause					
Recommendation(s)					
Investigate if the identified truck was using the compression brakes and request the limit of compression brake usage.					
Outcome / Action(s) / Future Action(s)					
The identified truck was asked to limit the compression braking and use these only when necessary. An email has been sent to the Complainant to extend the invitation for a meeting to discuss the matter.					
Closed Out Date	On-going	**Closed Out By**	On-going		

Stakeholder Liaison Register

Dixon Sand - Stakeholder Liaison Register

Stakeholder Name	Address	Date	Correspondence	Method of Communication	Dixon Staff	Action Required	Closed Out
Brett Ramm (R7)	No. 1539 Wisemans Ferry Road	18/10/2018	Selection of suitable location for Dust Gauge D12. Original proposed location is to be at R8 but unable to gain access to the property. The alternate location of D12 is on the fenceline between the two properties which is considered a suitable location to monitor dust impacts for R8. Site visit with contractor. Introduced Contractor to the landowner.	Face-to-face	HC	Nil	18/10/2018
Peter Goldstein (R6)	No. 1543 Wisemans Ferry Road	18/10/2018	Selection of suitable location for Dust Gauge D11. Lanowner not home. Access their property from Haerses Road quarry.	Phone call	HC	Nil	18/10/2018
Brett Ramm (R7)	No. 1539 Wisemans Ferry Road	30/10/2018	Notified landowner of the installation of dust gauge. Permission granted to proceed	Phone call	HC	Nil	30/10/2018
Peter Goldstein (R6)	No. 1543 Wisemans Ferry Road	30/10/2018	Notified landowner of the installation of dust gauge. Permission granted to proceed	Phone call	HC	Nil	30/10/2018
Brett Ramm (R7)	No. 1539 Wisemans Ferry Road	12/11/2018	Notified of the date of the dust gauge swap on site on 18	SMS	HC	Nil	12/11/2018
Peter Goldstein (R6)	No. 1543 Wisemans Ferry Road	12/11/2018	Notified of the date of the dust gauge swap on site	Phone call	HC	Nil	12/11/2018
Maroota Public School	4540 Old Northern Road	27/11/2017	Informed the school (spoke to the Principal) regarding the upcoming noise monitoring to be undertaken at the school. There will be no disturbance to the students	Phone call	HC	Nil	27/11/2018
Residents on Old Northern Road and Old Telegraph Road.	Refer to Dixon Sand No2 - Comm Info Flyer - Letter Box spreadsheet	29/11/2018	Letter box drop the community information flyers regarding the proposed Old Northern Road Quarry No. 2	Letter	HC	As required	As required
Phil Acurso (ONR R1)	4624 Old Northern Road	29/11/2018	Letter box drop - request permission to enter property to conduct bi-annual noise monitoring in early December 2018. Followed up with phone call - permission received	Telephone	HC	Nil	29/11/2018
Bruce Clark (ONR R6)	4634 Old Northern Road	29/11/2018	Letter box drop - request permission to enter property to conduct bi-annual noise monitoring in early December 2018. Followed up with phone call - left a voicemail. Bruce rung back at 4:20pm and gave permission to enter his property	Telephone	HC	Nil	29/11/2018
Maroota Public School	4540 Old Northern Road	22/05/2019	Informed the school regarding the upcoming noise monitoring to be undertaken at the school in June 2019. There will be no disturbance to the students	Telephone	HC	Nil	22/05/2019
David Cheng	1643 Wisemans Ferry Rd	3/06/2019	Sought permission to enter No. 1643 WFR to undertake attended noise monitoring in June 2019 during the day and shoulder period.	Telephone	HC	Nl	12/06/2019

Updated: 12/06/19
Updated by: Hunny Churcher

Appendix L – Waste Register

Old Northern Road
Waste Tracking Register 2018-2019

Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
21/06/2018 (not in last FY)	Scrap Metal	4.92	tonne	Westland	Recycle	WM-23812
28/06/2018 (not in last FY)	Scrap Metal	8.36	tonne	Westland	Recycle	WM-23812
17/07/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8212
1/08/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8219
1/08/2108	Grease	300	litres	Grease Eater	Recycle	79933
24/08/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8232
12/09/2018	Waste Oil	1200	Litres	Southern Oil	Treatment	232394
12/09/2018	Scrap Metal	13.28	tonne	Westland	Recycle	WM-23812
24/09/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8248
25/09/2108	Grease	300	litres	Grease Eater	Recycle	80454
3/10/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8251
18/10/2018	Waste Oil	1500	Litres	Southern Oil	Treatment	232547
23/10/2108	Grease	300	litres	Grease Eater	Recycle	80682
29/10/2018	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8272
20/11/2108	Grease	300	litres	Grease Eater	Recycle	80928
10/12/2018	Waste Oil	1000	Litres	Southern Oil	Treatment	192436
20/12/2108	Grease	300	litres	Grease Eater	Recycle	81182
19/01/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8359
19/01/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8370
16/03/2019	Scrap Metal	37	tonne	Westland	Recycle	WM-23871
14/02/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8385
13/03/2108	Grease	300	litres	Grease Eater	Recycle	81885
15/03/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8397
10/04/2108	Grease	300	litres	Grease Eater	Recycle	82109
23/04/2019	Waste Oil	2000	Litres	Southern Oil	Treatment	239138
2/04/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8408
8/05/2108	Grease	300	litres	Grease Eater	Recycle	82375
23/05/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8442
3/06/2108	Grease	300	litres	Grease Eater	Recycle	82603
24/06/2019	Non-putrescible	4	cubic metre	Asquith Mini Skips	Sort / Recycle / Disposal	8461
01/07/18 - 30/06/19	Genral Solid Waste - putrescible	78	cubic metre	Council Waste Contractor	Disposal	Council Rate
01/07/18 - 30/06/19	General Solid Waste - recyclable	13	cubic metre	Council Waste Contractor	Recycle	Council Rate
01/07/18 - 30/06/19	Printer Cartridges	<0.5	cubic metre	Post Office Collection Bin	Recycle	N/A

Total		
	Scrap Metal	63.56 tonnes
	Non-Putrescible	52 m3
	Waste oil	5700 litres
	Council Putrescible	78 m3
	Council Recycle	13 m3
	Printer Ink Catridge	<0.5 m3
	Grease	2700 litres

Haerses Road
Waste Tracking Register 2018 - 2019

Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
01/07/18 - 30/06/19	Genral Solid Waste - putrescible	26	cubic metre	Council Waste Contractor	Disposal	Council Rate
01/07/18 - 30/06/19	General Solid Waste - recyclable	13	cubic metre	Council Waste Contractor	Recycle	Council Rate
Jul 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Aug 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Sep 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Oct 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Nov 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Dec 2018	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Jan 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Feb 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Mar 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Apr 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
May 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup
Jun 2019	Non-putrescible	2	cubic metre	Cleanaway	Sort / Recycle / Disposal	Monthly Pickup

Total	Non-Putrescible skip	24	m3
	Council Putrescible	26	m3
	Council Recycle	13	m3

Appendix M – RFS Meeting Minutes

Meeting with Maroota Rural Fire Brigade – August 2018

Date: 27/08/2018

Time: 11:00 am– 12:00 pm

Attendees:

- Hunny Churcher (HC) –Dixon Sand's Environment Officer
- Peter Kazzi (PK) – Maroota RFS Captain

Agenda:

- Annual risk assessment and site inspection with local RFS representative.

Point of Discussion

- Actions from previous meeting have been completed
- PK advised that:
    - the bushfire season has been brought forward this year. The commencement date is 1st September 2018.
    - a number of Hazard Reduction burns were conducted in the Maroota area earlier this year, with Dixon Sand assisting the RFS by offering Haerses Road property for the Incident Control Centre.
    - it is predicted the fire season will experience exceptionally dry and hot conditions.
    - a Permit is required from the RFS to undertake any pile burn during the bushfire season.
- HC conveyed with PK that:
    - the Bushfire Management Plan (BFMP) has been developed separately for each quarry site – Haerses Road and Old Northern Road quarries.
    - The Bushfire Prone Area mapping by The Hills Shire Council has been revised and incorporated into the current version of the BFMPs.
    - not much has changed for Old Northern Road operations, therefore assets and mitigation measures remain the same.
    - Haerses Road expansion was recently approved. As a result, there are additional areas designated to remain as bushland for conservation purpose. The location of the new plant operation and weighbridge/site office will be incorporated in the risk assessment in the future.
- HC and PK undertook a site visit for both Old Northern Road and Haerses Road quarries.
- Both quarries remain low risk of bushfire due to quarry operations acting as a fire break, low risk of infrastructure catching fire.
- HC will re-train the BFMP requirements to staff in the upcoming Toolbox talk.

Action

Action	To Action By:
RFS to supply a map showing the areas depicting the planned and/or executed hazard reduction burns in the area.	PK
HC to organise vegetation trimming around the telecommunication pole located outside the front gate of Old Northern Road quarry.	HC