

APPENDIX 10. PRE-CLEARING AND CLEARANCE LETTERS



Tuesday, 22 March 2022

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works of Area 4a

Dear Sean,

This letter provides a summary of work undertaken on January 31 and February 1-2, 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation in Section 4a and remnant vegetation in surrounding sections 3, 3b, 4 & 4b at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Surveys

1.1 October 29, 2020

On 29 October 2020, Kleinfelder ecologists completed pre-clearance surveys of Sectors 3, 3A, 3B, 4, 4A and 4B to determine potential nest box requirements sufficiently in advance of clearing. 12 hollow bearing trees and 2 dead stags containing hollows were recorded, for a total of 14 small hollows. Several trees showed signs of use for gliders with horizontal chew marks and 3 fauna species were recorded during the survey including a Lace Monitor, Eastern Bearded Dragon and White Throated Nightjar. There were no significant weeds present within the area.

1.2 December 2, 2020.

On 2 December 2020, a Kleinfelder ecologist conducted a nocturnal fauna survey for Sectors 3, 3A, 4, 4A, 4B. One Brown Quail was detected during the survey and relocated to outside the resource area.

1.3 December 4, 2020.

On 4 December 2020, a Kleinfelder ecologist supervised the clearing of non-hollow bearing vegetation from Sector 3 and a small portion of Sectors 3A and 3B (see Figure 1). 1 Koala was located within a Blackbutt tree (*Eucalyptus pilularis*) and clearing operations were stopped immediately.



1.4 January 31, 2022

Wedgetail Ecologist, Kane Blundell attended site on January 31, 2022.

A pre-clearance survey was undertaken of the proposed clearing area that included portions of Sectors ₃B, 4a and 4B, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by a Kleinfelder ecologist on 29 October 2020. The previously identified hollows were determined to not contain hollows and are believed to have possibly been remnants of limbs burnt in the preceding fires, giving a hollow appearance. Given the age of the vegetation (less than 40 years), the presence of hollows would be unexpected. All trees previously identified as containing possible hollows were marked with paint, to be re-checked during clearing. The resource area was assessed for any other hollowbearing trees, hollow logs, dead stag trees containing hollows and stick nests. No other hollows or nests were identified in these areas. During the preclearance, no fauna was encountered.

Table 1 details the trees identified in 2020 by the Kleinfelder ecologist, that appeared to have suitable hollows for fauna. This table includes tree type (dead stag or species (genus) of tree), number of hollows (small – up to 8 cm; medium 8-20cm and large – > 20cm) and any obvious signs of the tree being in current use – this includes scratch marks, scats, feathers, nesting material, animal presence or any other evidence.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m x 10m, according to the Section .22 BRMP) that required demarcation.

ID no.	Collector	Species		Hollows	Signs of	
	(Kleinfelder)		Small	Medium	Large	Use
1	Mark Dean	Eucalyptus pilularis	1	0	0	None
2	Mark Dean	Bloodwood	1	0	0	None
3	Mark Dean	Eucalyptus pilularis	1	0	0	None
4	Mark Dean	Eucalyptus pilularis	1	ο	0	None
5	Mark Dean	Eucalyptus pilularis	1	ο	0	None
6	Mark Dean	Dead Stag	1	0	0	None
7	Mark Dean	Bloodwood	1	0	0	None
8	Mark Dean	Eucalyptus pilularis	1	ο	0	None
9	Mark Dean	Eucalyptus pilularis	1	ο	0	None
10	Mark Dean	Eucalyptus pilularis	1	ο	0	None

Table 1: Hollow bearing trees identified within Area 4A at Newcastle Sand Quarry



1.5 January 31, 2022

A night survey was undertaken on the 31st of January, to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrel-gliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine and call playbacks.

No target threatened species were detected during this survey. No other fauna was detected apart from flying fox flying overhead at dusk.

2. Tree Clearing Area 4A

2.1 February 1-2, 2022.

Ecologist Kane Blundell and Principal Ecologist Jonathan Berry from Wedgetail Project Consulting attended site on February 1 and February 2, 2022 respectively and supervised the clearing of vegetation from the area to be cleared (see Figure 2).

Immediately prior to clearing activities, the resource area was again surveyed for fauna and in particular Koalas. As no hollows or fauna were detected, clearing was commenced with an excavator under the supervision of the ecologist. Prior to clearing, the trees previously identified as containing hollows were isolated for final inspection, no hollows were identified and were subsequently cleared. Trees were carefully inspected once felled with particular attention to trees previously identified and within the vicinity of those previously identified as potentially containing hollows. There were no hollows detected within felled trees (Table 2).

Table 2: Final tall	y of hollows after clearin	g took place in Area	4A of Newcastle Sand Quarry	v
		J		

ID no.	Hollows counted prior to being felled		Signs of	Hollows counted after being felled			Comments	
	Small	Medium	Large	Use	Small	Medium	Large	
1	1	0	0	None	0	0	0	Undetected
2	1	0	0	None	0	0	0	Undetected
3	1	0	0	None	0	0	0	Undetected
4	1	0	0	None	0	0	0	Undetected
5	1	0	0	None	0	0	0	Undetected
6	1	0	0	None	0	0	0	Undetected
7	1	0	0	None	0	0	0	Undetected
8	1	0	0	None	0	0	0	Undetected



ID no.	Hollows being fel	counted led	prior to	Signs of	Hollows felled	counted af	Comments	
	Small	Medium	Large	Use	Small	Medium	Large	
9	1	0	0	None	0	0	0	Undetected
10	1	0	0	None	0	0	0	Undetected

For any further questions, please do not hesitate to call me.

Sincerely,

Kane Blundell Ecologist

M: 0419 999 256 kblundell@wedgetail.com.au







Thursday, 23 February 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works within Area 7C

Dear Sean,

This letter provides a summary of work undertaken on 14-16 and 20 June 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation in Section 7c and remnant vegetation in surrounding the area at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

14 June 2022

Wedgetail Ecologist, Mark Dean, attended site on 14 June 2022.

A pre-clearance survey was undertaken within the proposed clearing area that included a portion of Sector 7c, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by a Kleinfelder ecologist on 11 May 2016. The previously identified hollows were determined to contain hollows although some hollows were not deemed to be present in some trees. Given the age of the vegetation (less than 40 years), the presence of hollows would be unlikely. All trees previously identified as containing possible hollows were marked with paint, to be re-checked during clearing. The resource area was assessed for any other hollow-bearing trees, hollow logs, dead stag trees containing hollows and stick nests. Extra hollow bearing trees were identified in these areas and were marked up accordingly. During the preclearance, no fauna was encountered.

Table 1 details the trees identified in 2016 by the Kleinfelder ecologist and on the 14 June 2022 by the Wedgetail Ecologist, that appeared to have suitable hollows for fauna. This table includes tree type (dead stag or species (genus) of tree), number of hollows (small – up to 8 cm; medium 8-20cm and large – > 20cm) and any obvious signs of the tree being in current use – this includes scratch marks, scats, feathers, nesting material, animal presence or any other evidence.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m x 10m, according to the Section .22 BRMP) that required demarcation.



		-			· ·	
ID no.	Collector	Species		Signs of		
			Small	Medium	Large	Use
1	Luke O'Brien	Corymbia gummifera	0	0	2	None
2	Luke O'Brien	Corymbia gummifera	0	1	0	None
3	Luke O'Brien	Dead Stag	1	0	0	None
4	Luke O'Brien	Stringybark	1	0	2	None
5	Luke O'Brien	Corymbia gummifera	1	0	0	None
6	Luke O'Brien	Corymbia gummifera	1	0	0	None
16	Mark Dean	Stringybark	2	0	1	None
17	Mark Dean	Corymbia gummifera	2	0	0	None
18	Mark Dean	Corymbia gummifera	1	0	1	Worn hollow entry
19	Mark Dean	Corymbia gummifera	0	0	1	None
20	Mark Dean	Dead Stag	0	1	0	None
21	Mark Dean	Eucalyptus robustus	1	0	0	None
22	Mark Dean	Stringybark	1	0	0	None

Table 1: Hollow bearing trees identified within Area 7c at Newcastle Sand Quarry

1.1 14 June 2022

A night survey was undertaken on 14 June to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrelgliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine and call playbacks.

No targeted threatened species were detected during this survey.

2. Tree Clearing Area 7c

2.1 15, 16 and 20 June 2022

Ecologists Kane Blundell and Mark Dean from Wedgetail Project Consulting attended site on 15 and 16 June 2022 for under scrubbing supervision and on 20 June 2022 for the clearing supervision of hollow bearing trees respectively. (see Figure 1).

Immediately prior to clearing activities, the resource area was again surveyed for fauna and in particular Koalas. As hollows for fauna were detected, clearing of non-hollow bearing trees was commenced with an excavator under the supervision of the ecologist. Prior to clearing trees previously identified as containing hollows were isolated for two day period to allow Fauna to self-relocate. Trees were carefully inspected once felled with particular attention to trees previously identified and within the vicinity of those previously identified as potentially containing hollows. There were hollows detected within felled trees and are defined within **Table 2**.



One fauna species was captured and relocated during the clearing operations on the 20 June 2022. One Emerald Spotted Tree Frog (*Litoria peronii*) was captured from a hollow within a Swamp Mahogany and safely relocated into adjacent bush to the north of the disturbance area within the offsets (**Figure 2**).

	Hollows counted prior to				Hollows counted after being				
ID no.	being fel	led		Signs of	felled			Comments	
	Small	Medium	Large	Use	Small	Medium	Large		
1	o	o	2	None	0	0	1		
2	0	1	0	None	0	0	0		
3	1	0	0	None	1	0	0		
4	1	0	2	None	1	0	0		
5	1	0	0	None	0	0	0		
6	1	0	0	None	1	0	0		
16	2	0	1	None	2	o	1	Tree Retained within disturbance area	
17	2	0	0	None	1	0	0		
18	1	0	1	Worn hollow entry	1	0	1		
19	0	0	1	None	0	0	0		
20	0	1	0	None	0	1	0		
21	1	0	0	None	1	0	0	Frog Species Relocated	
22	1	0	0	None	1	0	0		
Total H	ollows Pre	sent after C	learing		9	1	3	Total: 13	

Table 2: Final tally of hollows after clearing took place in Area 4A of Newcastle Sand Quarry



For any further questions, please do not hesitate to call me.

Sincerely,

MJD

Mark Dean Ecologist

M: 0455 381 346 mdean@wedgetail.com.au







Thursday, 23 February 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works of Areas 4 & 4b

Dear Sean,

This letter provides a summary of work undertaken on 18-20 July 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation in Section 4 & 4b and remnant vegetation in surrounding the area at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

18 July 2022

Wedgetail Ecologist, Mark Dean, attended site on 18 July 2022.

A pre-clearance survey was undertaken of the proposed clearing area that included portions of Sectors 4 and 4B, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by a Kleinfelder ecologist on 29 October 2020. The previously identified hollows were determined to not contain hollows and are believed to have possibly been remnants of limbs burnt in the preceding fires, giving a hollow appearance. Given the age of the vegetation (less than 40 years), the presence of hollows would be unexpected. All trees previously identified as containing possible hollows were marked with paint, to be re-checked during clearing. The resource area was assessed for any other hollow-bearing trees, hollow logs, dead stag trees containing hollows and stick nests. No other hollows or nests were identified in these areas. During the day preclearance, no fauna was encountered.

Table 1 details the trees identified in 2020 by the Kleinfelder ecologist, that appeared to have suitable hollows for fauna. This table includes tree type (dead stag or species (genus) of tree), number of hollows (small – up to 8 cm; medium 8-20cm and large – > 20cm) and any obvious signs of the tree being in current use – this includes scratch marks, scats, feathers, nesting material, animal presence or any other evidence.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m \times 10m, according to the Section .22 BRMP) that required demarcation.



Table 1:	Hollow bearing trees identified within Area 4 and 4b at Newcastle Sand Quarry

ID no.	Collector	Species		Signs of			
	(Kleinfelder)		Small	Medium	Large	Use	
37	Mark Dean	Eucalyptus pilularis	1	0	0	None	
49	Mark Dean	Corymbia gummifera	1	0	0	None	
50	Mark Dean	Dead Stag	1	0	0	None	
51	Mark Dean	Corymbia gummifera	1	O	0	Glider chew marks on branches and trunk.	

1.1 18 July 2022

A night survey was undertaken on 18 July to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrelgliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine and call playbacks.

One target threatened species were detected during this survey. During the nocturnal surveys one Squirrel Glider (*Petaurus norfolcensis*) was observed feeding within a flowering tree to the south-east within the southern part of Sector 7. Additionally, a Tawny Frogmouth (*Podargus strigoides*) was observed foraging within Sector 4 and the location of the sighting was checked the morning of clearing for its presence and was not found.

2. Tree Clearing Area 4 & 4B

2.1 19-20 July 2022

Ecologist Mark Dean and Environmental Advisor Nathan Ottley from Wedgetail Project Consulting attended site on 19 and 20 July 2022 respectively and supervised the clearing of vegetation from the area to be cleared (see Figure 1).

Immediately prior to clearing activities, the resource area was again surveyed for fauna and in particular Koalas. As no hollows or fauna were detected, clearing was commenced with an excavator under the supervision of the ecologist. Prior to clearing, the trees previously identified as containing hollows were isolated for final inspection, no hollows were identified and were subsequently cleared. Trees were carefully inspected once felled with particular attention to trees previously identified and within the vicinity of those previously identified as potentially containing hollows. There were no hollows detected within felled trees (Table 2).

No fauna was found during the clearing operations.



ID no.	Hollows being fel	counted led	prior to	Signs of	Hollows felled	counted af	ter being	Comments	
	Small	Medium	Large	Use	Small	Medium	Large		
37	1	0	ο	None	0	0	0	Undetected	
49	1	0	0	None	0	0	0	Undetected	
50	1	ο	0	None	0	0	0	Undetected	
51	1	0	0	Glider Chew Marks	0	0	0	Undetected	

 Table 2: Final tally of hollows after clearing took place in Area 4A of Newcastle Sand Quarry

For any further questions, please do not hesitate to call me.

Sincerely,

MJD

Mark Dean Ecologist

M: 0455 381 346 mdean@wedgetail.com.au







Thursday, 23 February 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works of Sectors 5, 5a

Dear Sean,

This letter provides a summary of work undertaken on 7 & 8 September 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation in Section 5 & 5a, as well as portions of Sectors 4, 5b, 6, 6b and 7, and remnant vegetation in surrounding the area at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

5 September 2022

Wedgetail Ecologists, Nathan Ottley and Isaac Blundell, attended site on 18 July 2022.

A pre-clearance survey was undertaken of the proposed clearing area that included Sectors 5 & 5a, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by a Kleinfelder ecologist on 29 October 2020. The previously identified hollows were determined to not contain hollows and are believed to have possibly been remnants of limbs burnt in the preceding fires, giving a hollow appearance. Given the age of the vegetation (less than 40 years), the presence of hollows would be unexpected. All trees previously identified as containing possible hollows were marked with paint, to be rechecked during clearing. The resource area was assessed for any other hollow-bearing trees, hollow logs, dead stag trees containing hollows and stick nests. No other hollows or nests were identified in these areas. During the day preclearance, no fauna was encountered.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m x 10m, according to the Section .22 BRMP) that required demarcation.



6 September 2022

A night survey was undertaken on 6 September to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrel-gliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine.

During the nocturnal surveys, one Barn Owl (*Tyto alba*) was observed foraging within Sector 7 and the location of the sighting was checked the morning of clearing for its presence and was not found.

2. Tree Clearing Sectors 5 & 5a

7 & 8 September 2022

Environmental Advisor Nathan Ottley from Wedgetail Project Consulting attended site on 7 & 8 September 2022 respectively and supervised the clearing of vegetation from the area to be cleared (see Figure 1).

Immediately prior to clearing activities, the resource area was again surveyed for fauna and in particular Koalas. As no hollows or fauna were detected, clearing was commenced with an excavator under the supervision of the ecologist. Prior to clearing, the trees previously identified as containing hollows were isolated for final inspection, no hollows were identified and were subsequently cleared. Trees were carefully inspected once felled with particular attention to trees previously identified and within the vicinity of those previously identified as potentially containing hollows. There were no hollows detected within felled trees.

No fauna was found during the clearing operations.

For any further questions, please do not hesitate to call me.

Sincerely,

Nathan Ottley Environmental Advisor

M: 0478 224 563 nottley@wedgetail.com.au

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VVEDGETAIL	Newcastle Sand	
·vų· https://wedgetail.com.au/	398 Cabbage Tree Rd, Williamton NSW 2318	



Thursday, 23 February 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works of Sectors 5b

Dear Sean,

This letter provides a summary of work undertaken on 10 & 11 October 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation in the southern half of Section 5b at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

10 October 2022

Wedgetail Environmental Advisor, Nathan Ottley, attended site on 10 October 2022.

A pre-clearance survey was undertaken of the proposed clearing area in the southern half of Sectors 5b, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by a Kleinfelder ecologist on 29 October 2020. The previously identified hollows were determined to not contain hollows and are believed to have possibly been remnants of limbs burnt in the preceding fires, giving a hollow appearance. Given the age of the vegetation (less than 40 years), the presence of hollows would be unexpected. All trees previously identified as containing possible hollows were marked with paint, to be rechecked during clearing. The resource area was assessed for any other hollow-bearing trees, hollow logs, dead stag trees containing hollows and stick nests. No other hollows or nests were identified in these areas. During the day preclearance, no fauna was encountered.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m x 10m, according to the Section .22 BRMP) that required demarcation.



10 October 2022

A night survey was undertaken on 10 October to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrelgliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine.

No fauna was identified during the nocturnal surveys.

2. Tree Clearing Sectors 5b

11 October 2022

Environmental Advisor Nathan Ottley from Wedgetail Project Consulting attended site on 11 October 2022 to supervise the clearing of vegetation from the area to be cleared (see Figure 1).

Immediately prior to clearing activities, the resource area was again surveyed for fauna and in particular Koalas. As no hollows or fauna were detected, clearing was commenced with an excavator under the supervision of the ecologist. No trees in the work area were identified as containing hollows prior to clearing. There were no hollows detected within felled trees.

One fauna species, Long-nosed Bandicoot (*Perameles nasuta*), was identified during the clearing operations. The animal was safely escorted into adjacent bush to the east of the disturbance area.

For any further questions, please do not hesitate to call me.

Sincerely,

Nathan Ottley Environmental Advisor

M: 0478 224 563 nottley@wedgetail.com.au





Monday, 6 March 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Sean PennellSent by email to:Sean@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works within Area 7c

Dear Sean,

This letter provides a summary of work undertaken between 31 October & 4 November 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation within Section 7c at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

31 October 2022

Wedgetail Ecologist, Kane Blundell, attended site on 31 October 2022.

A pre-clearance survey was undertaken of the proposed clearing area within Sector 7c, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by Wedgetail ecologists, on 5 September 2022. All trees identified as containing possible hollows were marked with paint and flagging tape, to be monitored during clearing. The resource area was assessed for any other habitat features including hollow logs, burrows and stick nests. No other habitat features were identified in these areas. No fauna was detected in the afternoon preceding the clearing.

Table 1 details the trees identified by the Wedgetail ecologists, that appeared to have suitable hollows for fauna. This table includes tree type (dead stag or species (genus) of tree), number of hollows (small – up to 8 cm; medium 8-20cm and large – > 20cm) and any obvious signs of the tree being in current use – this includes scratch marks, scats, feathers, nesting material, animal presence or any other evidence.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m x 10m, according to the Section .22 BRMP) that required demarcation.



			-			,	
ID no		Collector (Wedgetail	Species		Signs of		
		Project Consulting)	- p	Small	Medium	Large	Use
	1	Isaac Blundell	Stump	0	1	0	None
	2	Nate Ottley	Stump	0	1	0	None
	3	-	Bloodwood	1	0	1	Yes
	4	Nate Ottley	Swamp Mahogany	1	0	0	None
	5	Isaac Blundell	Scribbly Gum	0	1	0	None
	6	Isaac Blundell	Swamp Mahogany	0	1	0	None
	7	Isaac Blundell	Swamp Mahogany	0	1	0	None
	8	Nate Ottley	-	1	0	0	None
	9	Nate Ottley	Swamp Mahogany	1	0	0	None
	10	Isaac Blundell	Swamp Mahogany	0	1	0	None
	11	Nate Ottley	Dead stag	1	0	0	None

Table 1:

Hollow bearing trees identified within Area 7c at Newcastle Sand Quarry

A night survey was also undertaken on 31 October 2022 to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (Phascolarctos cinereus) and Squirrel-gliders (Petaurus norfolcensis) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine and call playbacks. No fauna was detected within the clearing area during the nocturnal survey.

2. Tree Clearing within Area 7c

2.1 1 November 2022

Ecologists Kane Blundell and Nate Ottley, from Wedgetail Project Consulting attended site on 1 November 2022 to supervise the clearing of vegetation from the area to be cleared (see **Figure 1**).

Immediately prior to clearing activities, the resource area was again surveyed by both ecologists for fauna and in particular Koalas. Hollows were noted and plans regarding the management of these was discussed with machinery operator. As no fauna were detected, clearing was commenced with a D6 bulldozer, under the supervision of ecologist, Kane Blundell. Flagged trees containing hollows were isolated and left to stand for 48 hours after the initial clearing.

Areas being cleared were immediately inspected for any fauna that may have been disturbed during operations. 2 x Crinia signifera (Common Eastern Froglet) and 1 x Crinia tinnula (Wallum Froglet) were detected and caught (see Plates 1-3) and released outside of the works area, into the adjacent onsite-offset area.

During clearing operations, a tree was also felled containing a hive of feral bees. A photo was taken (Plate 4) and the location recorded, which was later reported to Department of Primary Industries as per recent varroa mite protocols (see Appendix 1).



2.2 4 November 2022

Ecologist Kane Blundell attended site on 4 November 2022, to supervise the clearing of the remaining hollow bearing trees. These trees were left standing after the initial clearing, for over 48 hours to give any undetected fauna a chance to vacate the area. All hollows were inspected prior to the commencement of works and no fauna was detected.

For any further questions, please do not hesitate to call me.

Sincerely,

Kane Blundell

Ecologist M: 0419 999 256 kblundell@wedgetail.com.au

	Areas Cleared (by month)	/year)
58	Clearing August 2019	
5 6 6	Clearing July 2020	
05A 05A	Clearing December 2020	
	Clearing March 2021	
GB GB	Clearing October 2021	
	Clearing February 2022	
	Clearing June 2022	
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WEDGET AIL Quary Plan (by sector) https://wedgetail.com.au/	Newcastle Sand 398 Cabbage Tree Rd, Williamton NSW 2318	









Beekeeper Notifications - Varroa Mite

NSW DPI has detected varroa mite (Varroa destructor), in NSW DPI surveillance hives at the Port of Newcastle.

NSW DPI is working to protect the NSW honey industry by carrying out an emergency response to this detection.

Use this form to report locations of hives and bees, or sightings of feral bee colonies.

For more information, see <u>www.dpi.nsw.gov.au/varroa</u>.

If this form does not allow you to report your bee hive concerns or you need to report additional information, please call the Exotic Plant Pest Hotline, **1800 084 881** (9am to 5pm, 7 days a week)

Name	Eliott Laver
Contact Phone Number	+448483551
Email	eliott@newcastlesand.com.au
My report is about	A wild hive or swarm
Please provide the details of the wild hive	

i. Please provide details of the wild hive location

Drop a pin on a map

Select wild hive location



Please provide photos of the wild hive

File(s) attached:



Please provide comments or notes regarding the wild hive

Whilst undertaking clearing for Sand mining operation a large hive and bee swarm was located in a hollow bearing tree.



Thursday, 2 March 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

Attention:Eliott LaverSent by email to:Eliott@newcastlesand.com.au

SUBJECT: Pre-clearance surveys and clearing works within Area 5b north

Dear Eliott,

This letter provides a summary of work undertaken between 22 & 24 November 2022. This includes nocturnal surveys and pre-clearance of, as well as clearing of vegetation within the northern half of Section 5b at the Newcastle Sand Quarry, 398 Cabbage Tree Road, Williamtown.

1. Preclearance Survey

22 November 2022

Wedgetail Environmental Advisor, Nathan Ottley, attended site on 22 November 2022.

A pre-clearance survey was undertaken of the proposed clearing area within Sector 5b, targeting native fauna, specifically the Koala, and investigating the presence of hollows previously identified by Wedgetail ecologists, on 5 September 2022. All trees identified as containing possible hollows were marked with paint and flagging tape, to be monitored during clearing. The resource area was assessed for any other habitat features including hollow logs, burrows and stick nests. No other habitat features were identified in these areas. No fauna was detected in the afternoon preceding the clearing.

The area was also surveyed for the presence and abundance of exotic weed species. The clearing zone contained no large areas of weeds (10m \times 10m, according to the Section .22 BRMP) that required demarcation.

A night survey was also undertaken on 22 November 2022 to identify the presence of fauna within the clearing boundary, targeting threatened species that occur within the region. Koalas (*Phascolarctos cinereus*) and Squirrel-gliders (*Petaurus norfolcensis*) were the target of this survey. Methods used were a combination of meander within the clearing zone with a spotlight to identify eye-shine and call playbacks.

No fauna was detected within the clearing area during the nocturnal survey.



2. Tree Clearing within Area 5b north

23-24 November 2022

Environmental Advisor Nate Ottley, from Wedgetail Project Consulting attended site on 23 and 24 November 2022 to supervise the clearing of vegetation from the area to be cleared (see **Figure 1**).

Immediately prior to clearing activities, the resource area was again surveyed by both ecologists for fauna and in particular Koalas. Hollows were noted and plans regarding the management of these was discussed with machinery operator. As no fauna were detected, clearing was commenced with an excavator, under the supervision of Environmental Advisor.

No fauna was identified during the clearing operations.

For any further questions, please do not hesitate to call me.

Sincerely,

Nathan Ottley

Environmental Advisor M: 0478 224 563 nottley@wedgetail.com.au




APPENDIX 11. NOISE MONITORING REPORTS



Document No: 161267/9547

ATTENDED NOISE MONITORING QUARTER 1 – MARCH 2022 Newcastle Sands Williamtown, NSW

Prepared for: Williamtown Sand Syndicate Pty Ltd Cabbage Tree Road WILLIAMTOWN NSW 2318

Author:

Neil Pennington B. Sc., B.Math. (Hons) MAIP, MAAS, MASA Principal / Director

April 2022



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- APPENDIX A Description of Acoustical Terms
- APPENDIX B Calibration Certificate





EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Newcastle Sand (NS) mine on 21, 22 and 23 March 2022. Monitoring was carried out in accordance with requirements of Development Consent (SSD-6125), EPL21264, the Newcastle Sand Noise Management Plan and other relevant Australian Standards and guidelines.

Monitoring was conducted by Matthew Pennington (Project Technician, Spectrum Acoustics).

The site was in full operation during the entire survey period.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Data from those times where noise from NS operations was audible and measurable were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive and low frequency components as per definitions of "modifying factor corrections" in the NSW Noise Policy for Industry. It is acknowledged that the general area is impacted by low and mid-range frequency noise from Cabbage Tree Road and identification of individual sources requires subjective assessment.

NS was compliant with Environmental Protection Licence (EPL) 21264 and Newcastle Sand Development Consent (SSD-6125) for Quarter 1 (March) 2022.





1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for Newcastle Sand (NS) on 21, 22 and 23 March 2022. Monitoring was undertaken in accordance with requirements of Newcastle Sand Noise Management Plan (NMP) dated March 2019. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NS Environmental Protection Licence (EPL) no 21264 and the Newcastle Sand Development Consent (SSD-6125). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 8.1) contains a table (Table 8) detailing recommended locations for attended noise monitoring and corresponding identification numbers for each boundary of the site, as follows.

Table 8: Noise monitoring locations

Generalised Location	Recommended Receptor ID
Nearest residence to west (at road level)	27
Nearest residence to west elevated on hill crest	14 ¹
Residence due south of quarry	38
Nearest residence to the south east	74

Condition M8.1 of the EPL states that attended noise monitoring is to be undertaken at a location representative of the most affected residences in the noise limit conditions. Monitoring was conducted at receiver number 42 which is representative of receivers south of the site. The monitoring location is also shown on **Figure 1**.

1.2 Monitoring Frequency and Duration

EPL21264 indicates that the attended noise monitoring must be conducted quarterly during the morningshoulder and day periods only. Each quarterly survey is to consist of 30 minute morning-shoulder measurements and 1.5 hour day measurements at one location representative of the most affected residences in the noise limit conditions (in accordance with EPL21264 to be done over a minimum of three consecutive 24 hour periods).







Figure 1 Noise Monitoring Location



2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L3.1 of the EPL. The criteria vary for each receiver monitoring location. The applicable morning-shoulder and day criterion is shown in the tables of results (**Tables 1 - 6** in **Section 4.1**). Noise criteria for all residences listed in the EPL are as shown below. The above noise criteria include the requirement that noise levels at day shoulder must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

Receiver	Day LAeq(15 Min)	Shoulder LAeq(15 Min)	Shoulder LA Max(1 Min)
Any residential reciever	43	39	45

Operational noise generated at the premises must not exceed the noise limits shown in the table above.

2.2 Monitoring Location Definition

Condition L3.7 of the EPL states that to determine compliance with the Leq (15 min) operational noise limits the noise measurement equipment must be measured at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- 2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted by Matthew Pennington (Spectrum Acoustics) with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix B. Field calibration is carried out at the start and end of each monitoring period.





A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NS was audible, Bruel & Kjaer "Evaluator" analysis software was used to quantify the contributions of NS and other significant noise sources to the overall noise level. Mine noise from NS is shown in the tables in bold type. Where noise from NS was inaudible during the lowest period of overall noise during each measurement, the NS contribution is given as "IA".

3.3 Meteorological Data

Meteorological data used in this report were taken from the Williamtown Bureau of Meteorology Station.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 NS Operations

Measured noise levels at the monitoring location are summarised in **Tables 1 - 6**.

				Table 1		
	NS Opera	ational Noi	se Monitoring	g Results – 21	March 2022	(Morning-Shoulder)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	77	39	<20	45	Traffic (77), birds (32), NS (IA)

1. L1 (1 min) from NS mine noise only.

	NS Operat	ional Noise N	Table 2 Ionitoring Result	s – 21 March 2022 (Day)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq
R42	7:30am	77	43	Traffic (77), birds (36), NS (IA)





				Table 3		
	NS Opera	ational Noi	se Monitoring	g Results – 22	2 March 2022	(Morning-Shoulder)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:39am	77	39	<20	45	Traffic (77), birds (35), NS (IA)

1. L1 (1 min) from NS mine noise only.

			Table 4	
	NS Operat	ional Noise N	Ionitoring Result	rs – 22 March 2022 (Day)
		dB(A),	Criterion	
Location	Time	Leq	dB(A) Leq	Identified Noise Sources, LAeq
R42	7:30am	77	43	Traffic (77), birds (31), NS (IA)

				Table 5		
	NS Opera	ational Noi	se Monitoring	g Results – 23	8 March 2022	(Morning-Shoulder)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:42am	76	39	<20	45	Traffic (76), birds (32), NS (IA)

1. L1 (1 min) from NS mine noise only.

	NS Operat	ional Noise N	Table 6 Ionitoring Result	s – 23 March 2022 (Day)
Location	Time	dB(A),	Criterion dB(A) Leg	Identified Noise Sources, I Aeg
R42	7:30am	77	43	Traffic (77), birds (36), NS (IA)

4.2 Discussion of Results

The results in **Tables 1-6** show that, under the operating and meteorological conditions at the times, for the 30 minute (morning-shoulder) and 1.5 hour (day) compliance measurement periods, the mine noise from NS was inaudible at the monitoring location. All of the noise measurements were made under compliant meteorological conditions. At the time of this measurement the wind speed at the weather station was less than 3m/s.

4.2.1 L1 (1 min)

The noise measurements results in **Tables 1, 3, & 5** (and site observations) show that noise from the operation of NS under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at the monitoring location. Since L1 (1 min) levels were significantly lower than the criterion, at the operational noise monitoring location, measurements at the residential facade was not considered necessary as compliance was assured.





APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS





	Demitton of acoustical terms
Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-
	Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and
	below atmospheric pressure and expressed in decibels. The human ear responds
	to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise
	over time. The time-varying level is computed to give an equivalent dB(A) level
	that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Table A1 Definition of acoustical terms





APPENDIX B

CALIBRATION CERTIFICATE





	SPECTRUMACOUSTICS
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	TINGER EL & KJÆR			NATA
Australian Calibration Laboratory Suite 4.03, Level 4, 3 Thomas Holt I Accredited for compliance with ISC	Drive, Macquarie Park NSW 2113, Australia D/IEC 17025 - Calibration. Laboratory No. 130	1		
CERTIFICATE OF	- CALIBRATION	Certificate No: CAU2100	0868	Page 1 of 11
CALIBRATION OF:				
Sound Level Meter:	Bruel & Kjaer	2250	No: 2747794	
Microphone:	Bruel & Kjaer	4189	No: 2733511	
Preamplifier:	Bruel & Kjaer	ZC-0032	No: 15339	
Supplied Calibrator:	Bruel & Kjaer	4231	No: 2466354	
Software version:	BZ7224 Version 4.6	Pattern Approval:	PTB	
Instruction manual:	BE1712-22	Identification:	N/A	
CUSTOMER:				
	Spectrum Acoustics Pty Ltd			
	Suite 1, 12 Alma Road			
	New Lambton NSW 2305			
CALIBRATION COND	THONS:			
Preconditioning:	1			
Environment conditions:	4 nours at 23 C see actual values in Environme	ental conditions sections		
Environment conditions: SPECIFICATIONS:	see actual values in Environme	ental conditions sections		
Environment conditions: SPECIFICATIONS: The Sound Level Meter has Procedures from IEC 61672 The measurements include	been calibrated in accordance wi -3:2013 were used to perform the	ental conditions sections th the requirements as specific e periodic tests. to Australian/National standar	ed in IEC61672-1:2(ds.	013 class 1.
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Document No: 161267/9620

ATTENDED NOISE MONITORING QUARTER 2 – JUNE 2022 Newcastle Sands Williamtown, NSW

Prepared for: Williamtown Sand Syndicate Pty Ltd Cabbage Tree Road WILLIAMTOWN NSW 2318

Author:

Neil Pennington B. Sc., B.Math. (Hons) MAIP, MAAS, MASA Principal / Director

July 2022



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- APPENDIX A Description of Acoustical Terms
- APPENDIX B Calibration Certificate





EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Newcastle Sand (NS) mine on 27, 28 and 29 June 2022. Monitoring was carried out in accordance with requirements of Development Consent (SSD-6125), EPL21264, the Newcastle Sand Noise Management Plan and other relevant Australian Standards and guidelines.

Monitoring was conducted by Matthew Pennington (Project Technician, Spectrum Acoustics).

The site was in full operation during the entire survey period.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Data from those times where noise from NS operations was audible and measurable were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive and low frequency components as per definitions of "modifying factor corrections" in the NSW Noise Policy for Industry. It is acknowledged that the general area is impacted by low and mid-range frequency noise from Cabbage Tree Road and identification of individual sources requires subjective assessment.

NS was compliant with Environmental Protection Licence (EPL) 21264 and Newcastle Sand Development Consent (SSD-6125) for Quarter 2 (June) 2022.





1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for Newcastle Sand (NS) on 27, 28 and 29 June 2022. Monitoring was undertaken in accordance with requirements of Newcastle Sand Noise Management Plan (NMP) dated March 2019. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NS Environmental Protection Licence (EPL) no 21264 and the Newcastle Sand Development Consent (SSD-6125). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 8.1) contains a table (Table 8) detailing recommended locations for attended noise monitoring and corresponding identification numbers for each boundary of the site, as follows.

Table 8: Noise monitoring locations

Generalised Location	Recommended Receptor ID
Nearest residence to west (at road level)	27
Nearest residence to west elevated on hill crest	14 ¹
Residence due south of quarry	38
Nearest residence to the south east	74

Condition M8.1 of the EPL states that attended noise monitoring is to be undertaken at a location representative of the most affected residences in the noise limit conditions. Monitoring was conducted at receiver number 42 which is representative of receivers south of the site. The monitoring location is also shown on **Figure 1**.

1.2 Monitoring Frequency and Duration

EPL21264 indicates that the attended noise monitoring must be conducted quarterly during the morningshoulder and day periods only. Each quarterly survey is to consist of 30 minute morning-shoulder measurements and 1.5 hour day measurements at one location representative of the most affected residences in the noise limit conditions (in accordance with EPL21264 to be done over a minimum of three consecutive 24 hour periods).







Figure 1 Noise Monitoring Location





2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L3.1 of the. The criteria vary for each receiver monitoring location. The applicable morning-shoulder and day criterion is shown in the tables of results (**Tables 1 - 6** in **Section 4.1**). Noise criteria for all residences listed in the EPL are as shown below. The above noise criteria include the requirement that noise levels at day shoulder must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

Receiver	Day LAeq(15 Min)	Shoulder LAeq(15 Min)	Shoulder LA Max(1 Min)
Any residential reciever	43	39	45

Operational noise generated at the premises must not exceed the noise limits shown in the table above.

2.2 Monitoring Location Definition

Condition L3.7 of the EPL states that to determine compliance with the Leq (15 min) operational noise limits the noise measurement equipment must be measured at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- 2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted by Matthew Pennington (Spectrum Acoustics) with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix B. Field calibration is carried out at the start and end of each monitoring period.





A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NS was audible, Bruel & Kjaer "Evaluator" analysis software was used to quantify the contributions of NS and other significant noise sources to the overall noise level. Mine noise from NS is shown in the tables in bold type. Where noise from NS was inaudible during the lowest period of overall noise during each measurement, the NS contribution is given as "IA".

3.3 Meteorological Data

Meteorological data used in this report were taken from the Williamtown Bureau of Meteorology Station.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 NS Operations

Measured noise levels at the monitoring location are summarised in Tables 1 - 6.

	Table 1								
	NS Operational Noise Monitoring Results – 27 June 2022 (Morning-Shoulder)								
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq			
R42	6:29am	65	39	<20	45	Traffic (65), birds (34), NS (IA)			

1. L1 (1 min) from NS mine noise only.

Table 2 NS Operational Noise Monitoring Results – 27, June 2022 (Day)							
	No Operational Noise Monitoring Results – 27 June 2022 (Day)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq			
R42	7:00am	66	43	Traffic (66), birds (33), NS (IA)			





				Table 3				
	NS Operational Noise Monitoring Results – 28 June 2022 (Morning-Shoulder)							
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq		
R42	6:28am	66	39	<20	45	Traffic (66), birds (33), NS (IA)		

1. L1 (1 min) from NS mine noise only.

Table 4 NS Operational Noise Monitoring Results – 28 June 2022 (Day)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	Identified Noise Sources, LAeq		
R42	7:00am	66	43	Traffic (66), birds (35), NS (IA)		

	Table 5								
	NS Operational Noise Monitoring Results – 29 June 2022 (Morning-Shoulder)								
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq			
R42	6:30am	65	39	<20	45	Traffic (65), birds (32), NS (IA)			

1. L1 (1 min) from NS mine noise only.

Table 6 NS Operational Noise Monitoring Results – 29 June 2022 (Day)						
Location	dB(A), Criterion Location Time Leg dB(A) Leg Identified Noise Sources, LAeg					
R42	7:01am	67	43	Traffic (67), birds (33), NS (IA)		

4.2 Discussion of Results

The results in **Tables 1-6** show that, under the operating and meteorological conditions at the times, for the 30 minute (morning-shoulder) and 1.5 hour (day) compliance measurement periods, the mine noise from NS was inaudible at the monitoring location. All of the noise measurements were made under compliant meteorological conditions. At the time of this measurement the wind speed at the weather station was less than 3m/s.

4.2.1 L1 (1 min)

The noise measurements results in **Tables 1, 3, & 5** (and site observations) show that noise from the operation of NS under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at the monitoring location. Since L1 (1 min) levels were significantly lower than the criterion, at the operational noise monitoring location, measurements at the residential facade was not considered necessary as compliance was assured.



APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS





Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-
	Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and
	below atmospheric pressure and expressed in decibels. The human ear responds
	to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise
	over time. The time-varying level is computed to give an equivalent dB(A) level
	that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Table A1 Definition of acoustical terms





APPENDIX B

CALIBRATION CERTIFICATE





	INGER L & KJÆR			
ustralian Calibration Laboratory uite 4.03, Level 4, 3 Thomas Holt D	Drive, Macquarie Park NSW 2113, Austra	alia		D .
CCREDITIES COMPLIANCE WITH ISO	/IEC 17025 - Calibration. Laboratory No	Certificate No: CAU2100	D868 Page 1 of	11
	CALIDITATION			
ALIBRATION OF:				
ound Level Meter:	Bruel & Kjaer	2250	No: 2747794	
licrophone:	Bruel & Kjaer	4189	No: 2733511	
reamplifier:	Bruel & Kjaer	ZC-0032	No: 15339	
upplied Calibrator:	Bruel & Kjaer	4231	No: 2466354	
ftware version:	BZ7224 Version 4.6	Pattern Approval:	PTB	
struction manual:	BE1712-22	Identification:	N/A	
JSTOMER:				
	Spectrum Acoustics Pty Lto	t in the second s		
	Suite 1, 12 Alma Road			
	New Lambton NSW 2305			
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Document No: 161267/9696

ATTENDED NOISE MONITORING QUARTER 3 – SEPTEMBER 2022 Newcastle Sands Williamtown, NSW

Prepared for: Williamtown Sand Syndicate Pty Ltd Cabbage Tree Road WILLIAMTOWN NSW 2318

Author:

Neil Pennington B. Sc., B.Math. (Hons) MAIP, MAAS, MASA Principal / Director

September 2022



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- APPENDIX B Calibration Certificate





EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Newcastle Sand (NS) mine on 19, 20 and 21 September 2022. Monitoring was carried out in accordance with requirements of Development Consent (SSD-6125), EPL21264, the Newcastle Sand Noise Management Plan and other relevant Australian Standards and guidelines.

Monitoring was conducted by Matthew Pennington (Project Technician, Spectrum Acoustics).

The site was in full operation during the entire survey period.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Data from those times where noise from NS operations was audible and measurable were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive and low frequency components as per definitions of "modifying factor corrections" in the NSW Noise Policy for Industry. It is acknowledged that the general area is impacted by low and mid-range frequency noise from Cabbage Tree Road and identification of individual sources requires subjective assessment.

NS was compliant with Environmental Protection Licence (EPL) 21264 and Newcastle Sand Development Consent (SSD-6125) for Quarter 3 (September) 2022.





1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for Newcastle Sand (NS) on 19, 20 and 21 September 2022. Monitoring was undertaken in accordance with requirements of Newcastle Sand Noise Management Plan (NMP) dated March 2019. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NS Environmental Protection Licence (EPL) no 21264 and the Newcastle Sand Development Consent (SSD-6125). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 8.1) contains a table (Table 8) detailing recommended locations for attended noise monitoring and corresponding identification numbers for each boundary of the site, as follows.

Table 8: Noise monitoring locations

Generalised Location	Recommended Receptor ID
Nearest residence to west (at road level)	27
Nearest residence to west elevated on hill crest	14 ¹
Residence due south of quarry	38
Nearest residence to the south east	74

Condition M8.1 of the EPL states that attended noise monitoring is to be undertaken at a location representative of the most affected residences in the noise limit conditions. Monitoring was conducted at receiver number 42 which is representative of receivers south of the site. The monitoring location is also shown on **Figure 1**.

1.2 Monitoring Frequency and Duration

EPL21264 indicates that the attended noise monitoring must be conducted quarterly during the morningshoulder and day periods only. Each quarterly survey is to consist of 30 minute morning-shoulder measurements and 1.5 hour day measurements at one location representative of the most affected residences in the noise limit conditions (in accordance with EPL21264 to be done over a minimum of three consecutive 24 hour periods).







Figure 1 Noise Monitoring Location



2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L3.1 of the. The criteria vary for each receiver monitoring location. The applicable morning-shoulder and day criterion is shown in the tables of results (**Tables 1 - 6** in **Section 4.1**). Noise criteria for all residences listed in the EPL are as shown below. The above noise criteria include the requirement that noise levels at day shoulder must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

Receiver	Day LAeq(15 Min)	Shoulder LAeq(15 Min)	Shoulder LA Max(1 Min)
Any residential reciever	43	39	45

Operational noise generated at the premises must not exceed the noise limits shown in the table above.

2.2 Monitoring Location Definition

Condition L3.7 of the EPL states that to determine compliance with the Leq (15 min) operational noise limits the noise measurement equipment must be measured at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- 2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted by Matthew Pennington (Spectrum Acoustics) with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix B. Field calibration is carried out at the start and end of each monitoring period.





A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the noise from NS was audible, Bruel & Kjaer "Evaluator" analysis software was used to quantify the contributions of NS and other significant noise sources to the overall noise level. Mine noise from NS is shown in the tables in bold type. Where noise from NS was inaudible during the lowest period of overall noise during each measurement, the NS contribution is given as "IA".

3.3 Meteorological Data

Meteorological data used in this report were taken from the Williamtown Bureau of Meteorology Station.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 NS Operations

Measured noise levels at the monitoring location are summarised in **Tables 1 - 6**.

				Table 1		
	NS Operation	onal Noise	Monitoring R	lesults – 19 S	eptember 202	2 (Morning-Shoulder)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	66	39	<20	45	Traffic (66), birds (32), NS (IA)

1. L1 (1 min) from NS mine noise only.

Table 2						
	NS Operational Noise Monitoring Results – 19 September 2022 (Day)					
	dB(A), Criterion					
Location	Time	Leq	dB(A) Leq	Identified Noise Sources, LAeq		
R42	7:00am	67	43	Traffic (67), birds (35), NS (IA)		





				Table 3		
	NS Operation	onal Noise	Monitoring R	lesults – 20 S	eptember 202	22 (Morning-Shoulder)
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:29am	67	39	<20	45	Traffic (67), birds (30), NS (IA)

1. L1 (1 min) from NS mine noise only.

	Table 4					
	NS Operational Noise Monitoring Results – 20 September 2022 (Day)					
	dB(A), Criterion					
Location	Time	Leq	dB(A) Leq	Identified Noise Sources, LAeq		
R42	7:00am	66	43	Traffic (66), birds (36), NS (IA)		

				Table 5		
NS Operational Noise Monitoring Results – 21 September 2022 (Morning-Shoulder)						
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	67	39	<20	45	Traffic (67), birds (34), NS (IA)

1. L1 (1 min) from NS mine noise only.

Table 6 NS Operational Noise Monitoring Results – 21 September 2022 (Day)				
Location Time Leg dB(A), Criterion Identified Noise Sources, LAeg				
R42	7:01am	66	43	Traffic (66), birds (35), NS (IA)

4.2 Discussion of Results

The results in **Tables 1-6** show that, under the operating and meteorological conditions at the times, for the 30 minute (morning-shoulder) and 1.5 hour (day) compliance measurement periods, the mine noise from NS was inaudible at the monitoring location. All of the noise measurements were made under compliant meteorological conditions. At the time of this measurement the wind speed at the weather station was less than 3m/s.

4.2.1 L1 (1 min)

The noise measurements results in **Tables 1, 3, & 5** (and site observations) show that noise from the operation of NS under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at the monitoring location. Since L1 (1 min) levels were significantly lower than the criterion, at the operational noise monitoring location, measurements at the residential facade was not considered necessary as compliance was assured.





APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS





	-
Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-
	Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and
	below atmospheric pressure and expressed in decibels. The human ear responds
	to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise
	over time. The time-varying level is computed to give an equivalent dB(A) level
	that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Table A1Definition of acoustical terms




APPENDIX B

CALIBRATION CERTIFICATE





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Document No: 161267/9786

ATTENDED NOISE MONITORING QUARTER 4 – DECEMBER 2022 Newcastle Sands Williamtown, NSW

Prepared for: Williamtown Sand Syndicate Pty Ltd Cabbage Tree Road WILLIAMTOWN NSW 2318

Author:

Neil Pennington B. Sc., B.Math. (Hons) MAIP, MAAS, MASA Principal / Director

January 2023



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- APPENDIX A Description of Acoustical Terms
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EXECUTIVE SUMMARY

Attended noise monitoring has been carried out for the Newcastle Sand (NS) <u>mine-guarry</u> on 28, 29 and 30 December 2022. Monitoring was carried out in accordance with requirements of Development Consent (SSD-6125), EPL21264, the Newcastle Sand Noise Management Plan and other relevant Australian Standards and guidelines.

Monitoring was conducted by Matthew Pennington (Project Consultant, Spectrum Acoustics) & Isaac Pennington (Field Technician, Spectrum Acoustics)

The site was <u>not in in full</u> operation during the <u>entire</u> survey period, <u>however</u>, the monitoring validates the inaudible nature of the NS quarry that has been recorded throughout previous surveys in 2022 where the <u>quarry was in operation</u>.

The site-specific operational criteria were not exceeded at any location or at any time throughout the monitoring period.

Data from those times where noise from NS operations was audible and measurablewas were analysed using Bruel & Kjaer *"Evaluator"* software. This analysis showed the noise did not contain any tonal, impulsive and low frequency components as per definitions of "modifying factor corrections" in the NSW Noise Policy for Industry. It is acknowledged that the general area is impacted by low and mid-range frequency noise from Cabbage Tree Road and identification of individual sources requires subjective assessment.

NS was compliant with Environmental Protection Licence (EPL) 21264 and Newcastle Sand Development Consent (SSD-6125) for Quarter 4 (December) 2022.





1.0 INTRODUCTION

This report presents the results of attended noise compliance monitoring and measurements conducted for Newcastle Sand (NS) on 28, 29 and 30 December 2022, earlier monitoring during December was not feasible due to weather (rain) and other commitments, however, this event validates the inaudible nature of the quarry shown from previous monitoring in 2022. Monitoring was undertaken in accordance with requirements of Newcastle Sand Noise Management Plan (NMP) dated March 2019. The noise monitoring programme and procedures in the NMP have been developed in accordance with the NS Environmental Protection Licence (EPL) no 21264 and the Newcastle Sand Development Consent (SSD-6125). To aid in the understanding of this report a description of acoustical terms is attached as **Appendix A**.

1.1 Noise Monitoring Locations

The NMP (Section 8.1) contains a table (Table 8) detailing recommended locations for attended noise monitoring and corresponding identification numbers for each boundary of the site, as follows.

Table 8:	Noise	monitoring	locations

Generalised Location	Recommended Receptor ID
Nearest residence to west (at road level)	27
Nearest residence to west elevated on hill crest	14 ¹
Residence due south of quarry	38
Nearest residence to the south east	74

Condition M8.1 of the EPL states that attended noise monitoring is to be undertaken at a location representative of the most affected residences in the noise limit conditions. Monitoring was conducted at receiver number 42 which is representative of receivers south of the site. The monitoring location is also shown on **Figure 1**.

1.2 Monitoring Frequency and Duration

EPL21264 indicates that the attended noise monitoring must be conducted quarterly during the morningshoulder and day periods only. Each quarterly survey is to consist of 30 minute morning-shoulder measurements and 1.5 hour day measurements at one location representative of the most affected residences in the noise limit conditions (in accordance with EPL21264 to be done over a minimum of three consecutive 24 hour periods).







Figure 1 Noise Monitoring Location



2.0 CRITERIA AND CONDITIONS

2.1 Noise Assessment Criteria

The noise assessment criteria are detailed in Condition L3.1 of the. The criteria vary for each receiver monitoring location. The applicable morning-shoulder and day criterion is shown in the tables of results (**Tables 1 - 6** in **Section 4.1**). Noise criteria for all residences listed in the EPL are as shown below. The above noise criteria include the requirement that noise levels at day shoulder must not exceed **45 dB(A) L1 (1 min)** (sleep disturbance criterion) at any residence.

Receiver	Day LAeq(15 Min)	Shoulder LAeq(15 Min)	Shoulder LA Max(1 Min)
Any residential reciever	43	39	45

Operational noise generated at the premises must not exceed the noise limits shown in the table above.

2.2 Monitoring Location Definition

Condition L3.7 of the EPL states that to determine compliance with the Leq (15 min) operational noise limits the noise measurement equipment must be measured at the most affected point on or within the residential boundary, or at the most affected point within 30m of the dwelling where the dwelling is more than 30m from the boundary.

2.3 Applicable Meteorological Conditions

The noise limits apply under all meteorological conditions except for any one of the following;

- 1. Wind speeds greater than 3m/s at 10m above ground level; or
- 2. Stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or
- 3. Stability category G temperature inversion conditions.

2.4 Other Conditions

To determine compliance with the Leq (15 min) operational noise criteria the modification factors in Fact Sheet C of the NSW Noise Policy for Industry must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

3.0 NOISE MONITORING PROCEDURE

3.1 Monitoring Equipment

Attended noise monitoring was conducted by Matthew Pennington (Spectrum Acoustics) with a Brüel & Kjær Type 2250 Precision Sound Analyser. This instrument has Class 1 characteristics as defined in AS IEC61672.1-2019 and has current NATA calibration. Calibration certificates are included in Appendix B. Field calibration is carried out at the start and end of each monitoring period.





A-weighted noise levels were measured over the 15-minute monitoring periods with data acquired at 1 or 2 second statistical intervals and the meter set to "fast" response. Each 1 or 2 second measurement is accompanied by a third-octave band spectrum from 20 - 20k Hz which is required for analysing NPI 'modifying factors'. Time based field notes allow for determination of the relative contributions to the overall noise level of all significant noise sources.

3.2 Measurement Analysis

The 15 minute Leq noise level for each monitoring period is shown in the tables below. Where the<u>lf</u> noise from NS was audible, Bruel & Kjaer "Evaluator" analysis software was used to quantify the contributions of NS and other significant noise sources to the overall noise level. Mine noise from NS is shown in the tables in bold type. Where noise from NS was inaudible during the lowest period of overall noise during each measurement, the NS contribution is given as "IA".

3.3 Meteorological Data

Meteorological data used in this report were taken from the Williamtown Bureau of Meteorology Station.

4.0 RESULTS AND DISCUSSION

4.1 Measured Noise Levels

4.1.1 NS Operations

Measured noise levels at the monitoring location are summarised in **Tables 1 - 6**.

Table 1						
	NS Operational Noise Monitoring Results – 28 December 2022 (Morning-Shoulder)					
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	67	39	<20	45	Traffic (67), birds (28), NS (IA)

1. L1 (1 min) from NS mine noise only.

	Table 2						
	NS Operational Noise Monitoring Results – 28 December 2022 (Day)						
	dB(A), Criterion						
Location	Time	Leq	dB(A) Leq	Identified Noise Sources, LAeq			
R42	7:00am	66	43	Traffic (66), birds (31), NS (IA)			





Table 3						
	NS Operational Noise Monitoring Results – 29 December 2022 (Morning-Shoulder)					
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	66	39	<20	45	Traffic (66), birds (32), NS (IA)

1. L1 (1 min) from NS mine noise only.

	Table 4						
	NS Operatio	nal Noise Mo	nitoring Results	– 29 December 2022 (Day)			
	dB(A), Criterion						
Location	Time	Leq	dB(A) Leq	Identified Noise Sources, LAeq			
R42	7:00am	67	43	Traffic (66), birds (35), NS (IA)			

	Table 5					
	NS Operational Noise Monitoring Results – 30 December 2022 (Morning-Shoulder)					
Location	Time	dB(A), Leq	Criterion dB(A) Leq	dB(A), L1 (1min) ¹	Criterion dB(A), L1 (1min) ¹	Identified Noise Sources, LAeq
R42	6:30am	66	39	<20	45	Traffic (66), birds (31), NS (IA)

1. L1 (1 min) from NS mine noise only.

Table 6 NS Operational Noise Monitoring Results – 30 December 2022 (Day)					
Location	Time	dB(A), Lea	Criterion dB(A) Leg	Identified Noise Sources. LAea	
R42	7:00am	66	43	Traffic (66), birds (33), NS (IA)	

4.2 Discussion of Results

The results in **Tables 1-6** show that, under the operating and meteorological conditions at the times, for the 30 minute (morning-shoulder) and 1.5 hour (day) compliance measurement periods, the <u>mine-noise levels</u> recorded in December 2022 when the quarry was not operating were consistent with previous events for 2022, <u>demonstrating that the quarry does not contribute to noise levels</u> noise from NS was inaudible at the monitoring location. All of the noise measurements were made under compliant meteorological conditions. At the time of this measurement the wind speed at the weather station was less than 3m/s.

4.2.1 L1 (1 min)

The noise measurements results in **Tables 1, 3, & 5** (and site observations) show that noise from the operation of NS under the operating and meteorological conditions at the times, did not exceed the L1 (1 min) criterion at the monitoring location. Since L1 (1 min) levels were significantly lower than the criterion, at the operational noise monitoring location, measurements at the residential facade was not considered necessary as compliance was assured.





Newcastle Sand Noise Monitoring – December 2022



APPENDIX A

DESCRIPTION OF ACOUSTICAL TERMS





Term	Description
dB(A)	The quantitative measure of sound heard by the human ear, measured by the A-
	Scale Weighting Network of a sound level meter expressed in decibels (dB).
SPL	Sound Pressure Level. The incremental variation of sound pressure above and
	below atmospheric pressure and expressed in decibels. The human ear responds
	to pressure fluctuations, resulting in sound being heard.
STL	Sound Transmission Loss. The ability of a partition to attenuate sound, in dB.
Lw	Sound Power Level radiated by a noise source per unit time re 1pW.
Leq	Equivalent Continuous Noise Level - taking into account the fluctuations of noise
	over time. The time-varying level is computed to give an equivalent dB(A) level
	that is equal to the energy content and time period.
L1	Average Peak Noise Level - the level exceeded for 1% of the monitoring period.
L90	"Background" Noise Level - the level exceeded for 90% of the monitoring period.

Table A1Definition of acoustical terms



APPENDIX B

CALIBRATION CERTIFICATE





	L & KJÆR			NATA
ustralian Calibration Laboratory uite 4.03, Level 4, 3 Thomas Holt D sccredited for compliance with ISO,	rive, Macquarie Park NSW 2113, Australia /IEC 17025 - Calibration. Laboratory No. 130	01		WORLD RECOGNISED
CERTIFICATE OF	CALIBRATION	Certificate No: CAU210	0868	Page 1 of 11
ALIBRATION OF:				
ound Level Meter:	Bruel & Kjaer	2250	No: 2747794	
licrophone:	Bruel & Kjaer	4189	No: 2733511	
reamplifier:	Bruel & Kjaer	ZC-0032	No: 15339	
upplied Calibrator:	Bruel & Kjaer	4231	No: 2466354	
oftware version:	BZ7224 Version 4.6	Pattern Approval:	PTB	
struction manual:	BE1712-22	Identification:	N/A	
USTOMER:	51			10 m
	Spectrum Acoustics Pty Ltd			
	Suite 1, 12 Alma Road			
	New Lambton NSW 2305			
ALIBRATION CONDI	TIONS:			
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APPENDIX 12. PFAS EXPOSURE PATHWAYS REVIEW

Williamtown Sand Syndicate – Per- and Polyfluoroalkyl Substances Annual Risk Review

398 Cabbage Tree Road, Williamtown, New South Wales, 2318

20232071 27 January 2022 NCA23R2071





Suite 3, 240-244 Pacific Highway, Charlestown, NSW 2290 Phone: +61 2 4949 5200

27 January 2022 20232071

Jonathan Berry Principal Advisor Wedgetail Project Consulting PO Box 898, Newcastle, NSW 2300

Attention: Jonathan Berry

Subject: Williamtown Sand Syndicate – Per- and Polyfluoroalkyl Substances Annual Risk Review 398 Cabbage Tree Road, Williamtown, New South Wales, 2318

Executive Summary

Kleinfelder Australia were engaged by Wedgetail Project Consulting, on behalf of the Williamtown Sand Syndicate (WSS) to undertake a review of the 2022 quarrying activities at Newcastle Sand and determine whether these activities have changed the potential for local residents to be exposed to per- and polyfluoroalkyl substances (PFAS). Regional PFAS contamination in the quarry area is related to contamination at and from the Department of Defence (DoD) Williamtown Royal Australian Air Force Base ("the Base"). PFAS has been identified in sediment, surface water, groundwater and biota (terrestrial and aquatic) within and surrounding the Base.

The Newcastle Sand quarry is located at 398 Cabbage Tree Road, Williamtown ("the Site") and is situated partially within the New South Wales Environment Protection Authority (EPA) defined Williamtown Management Area (WMA). The Site is located within the WMA broader management zone, defined as an area where PFAS could be identified at the current time and into the future. EPA precautionary advice to minimise PFAS exposure within the broader management zone includes avoiding the use of groundwater and surface water and consuming home-grown produce.

This report forms the requirement to Schedule 3 Condition 48 in the Development Consent SSD-6125 which requires an assessment of whether quarrying operations are increasing the risk of PFAS exposure for local residents and the environment.

Since 2007, the DoD have been investigating the PFAS presence in various media at and surrounding the Base. The investigations have included multiple rounds of soil, sediment, surface water and groundwater sampling within the EPA defined WMA. Off-Base PFAS surface water and groundwater, PFAS fate and transport models and human and ecological health risk assessments have also been conducted. The human health risk assessment identified four "risk zones", designated zones A through D and corresponding with a risk hierarchy such that Zone A is the highest risk and Zone D is the lowest. Part of the Site is situated within the low-risk zone C, with the north-western Site area located outside the defined risk zones. Zones C and D broadly correspond with the WMA broader management area.

The principal PFAS of concern with the Base and WMA is PFOS, which generally comprises >60% of the PFAS present.

A review of the available information, that includes the Site setting, PFAS sampling and analysis undertaken at the Site and those conducted by the DoD at the Base and surrounding area leads to the following conclusions:

- PFAS migration from primary or secondary Base sources is unlikely to reach the Site.
- PFAS are not present in Site soil.
- In surface water, PFAS was not present this monitoring period. Past detections were mainly at SW4 along the eastern most boundary.

- The PFAS in this area is likely sourced from an irrigation channel that is at or near the level of the major channel to the east.
- PFAS are generally not considered present in groundwater. While there were two sporadic 6:2 FTS occurrences, these are not considered to represent widespread contamination within the aquifer onsite.
- In 2022 PFAS in the wash plant water and wash plant fines were assessed:
 - Concentrations of PFAS (PFOA, PFOS and PFHxS) were reported at similar concentrations to previous years with concentrations below the site-specific trigger values.
 - PFAS concentrations (PFPeA, PFOS) were reported in wash plant fines (silt and organic material) in three of four samples. The reported concentrations are similar to previous results and do not exceed the screening criteria.
 - Based on the wash plant sample results, it is probable that a minor PFAS source is present in the wash plant or within the silt and organic material.
- The floor of the quarry is based on maintaining a 0.7m buffer above the maximum predicted ground water level. The ground water elevation (GWE) across the Site was considerably higher than historical levels due to the above average rainfall present for the majority of the year. Groundwater elevation exceeded the inferred maximum levels at five locations (BH1, BH1A, BH2, BH10 & BH11) during ten separately measured occasions this year.
- At the highest groundwater table levels, quarry floor levels always remained at worst, 166mm above the groundwater table and did not intercept groundwater. The nearest groundwater sampling point to the current quarry floor islocated at BH1/BH1A, adjacent to current quarrying activities in Sector 3. Given there was no interception of groundwater and groundwater is not contaminated, this is unlikely to have resulted in any increased risk to on-, or off-Site receptors.

The DoD-commissioned human health risk assessment (HRA) determined that the Site is within PFAS Risk Zone C for impacts originating from the Base. This quarry PFAS risk assessment review for 2022 compared the upper exposure scenario (i.e., highest concentration) for risk zone C detailed within the DOD HRA with potential exposures from the quarry and concludes:

- The only product produced onsite where repeatable PFAS detections have occurred and have a potential risk to nearby residents and ecological receptors is the wash plant fines (silt and organic material) where the stockpiled fines could be transported from the Site via dust dispersion. This is unlikely as:
 - Dust mitigation measures undertaken by Newcastle Sand are likely to reduce this risk, and the fines form an agglomerated matrix, more consolidated and bound than existing silts and clays onsite.
 - The PFAS concentrations are below the human and ecological health screening criteria and the risk is therefore low and acceptable.
 - Fines are approved for use within rehabilitation or to be blended for use as a landscaping product. With the repeated detections of PFAS, prior to offsite removal and sale of the material it will be necessary to assess concentrations within this material to ensure it is suitable and consistent with relevant criteria.
- Other quarrying operations will not increase the PFAS risk to residents because:
 - PFAS was not detected in any surface water samples in 2022.
 - PFAS reported at other Site monitored locations are sporadic and do not indicate PFAS contamination is present.
 - Quarrying operations could result in the establishment of a short-term groundwater mound, however, this is unlikely to change the current groundwater flow regime.
 - The Base PFAS groundwater plumes are not estimated to intersect the eastern Site boundary prior to 2050, with the predicted PFAS concentrations unlikely to exceed human health drinking water criteria until significantly after 2050, if at all.
 - Historical prevailing wind directions and dust mitigation measures undertaken by the quarry operator will not result in additional PFAS impacts to nearby residents.



1 INTRODUCTION & OBJECTIVES

Wedgetail Project Consulting commissioned Kleinfelder to undertake a review of Department of Defence (DoD) and the NSW EPA information regarding PFAS contamination that originated from the Williamtown Royal Australian Air Force (RAAF) Base ("the Base"). The Site is within the NSW EPA declared WMA.

The WMA was established by the NSW EPA following DoD commissioned testing of sediment, soil, groundwater, surface water and aquatic and terrestrial biota which identified a large area affected by PFAS contamination originally sourced from the Base (**Figure 1**). The EPA management area is comprised of three zones:

- Primary high PFAS concentrations have been observed.
- Secondary low PFAS concentrations have been identified.
- Broader topography and hydrology are used to suggest that PFAS could be identified in the future.

The Site is within the broader management area where the Site's eastern boundary is 1.4 km from the Base's western boundary.

In accordance with Condition 48 of the quarry approval note an annual review of the current available PFAS information relating to PFAS exposure pathways for contamination originating from the Base is required to be conducted. The review is to assess if the quarrying activities have resulted in an increased PFAS exposure for local residents. Condition 48 states the following:

"In conjunction with preparation of each Annual Review, unless otherwise agreed with the Secretary, the Applicant shall engage a suitably qualified and experienced independent expert, approved by the Secretary, to review the currently available information on exposure pathways for PFAS contamination originating from the Williamtown RAAF Base, as may be applicable to local residents and the development. This report must assess whether or not quarrying operations are increasing the risk of PFAS exposure for local residents and/or the environment, to the satisfaction of the Secretary. The Applicant must ensure that the Review of PFAS Exposure Pathways reports are placed on its website and are available to the CCC and any interested person on request."

2 OBJECTIVE

The objective of this review is to assess if the quarrying activities have resulted in an increased PFAS exposure for local residents.

3 SITE SETTING

The site is located approximately 1.4 km to the southwest of the Base's western boundary. The general land use in the vicinity of the Site is large-lot residential and farming. Residential properties are located to the Site's east, west and south with larger conservation reserves on the northern boundaries. The Tilligerry Habitat Reserve forms part of the western and northern Site boundaries.

The Williamtown area receives a mean annual rainfall of 1,127.6 mm, with the highest rainfall months typically between January and June, where the monthly mean rainfall typically exceeds 100 mm (Bureau of Meteorology weather station 061078). Mean monthly temperatures range between 17°C and 28°C, indicating the climate is warm temperate. The prevailing 9 AM wind directions at the Base are north-westerly (25%) and westerly (22%), i.e., away from the Site. Calm is the third most common observation (14%). Wind directions toward the Site are north-easterly (6%) and easterly (5%). Predominant 3 PM wind directions are south-easterly (24%) and southerly (16%). Afternoon wind directions toward the Site are easterly (14%) and north-easterly (8%).

Geologically the Site is located within the Tomago Sandbeds, a linear series of shallow sand dunes that cover approximately 200 km² between Newcastle and Lemon Tree Passage, that have a mean thickness of 20 metres¹. The beds were deposited from the Hunter and Karuah rivers during a period of high sea level and overlie clay and rock. The aquifer is the Tomago Sandbeds, with the underlying clay and rock generally acting as a barrier to vertical groundwater migration. The DoD 2022

(www.defence.gov.au/environment/pfas/Williamtown/publications.asp) groundwater hydraulic gradients indicate

¹ Crosbie, R.S., 2003. Regional scaling of groundwater recharge. PhD Thesis, University of Newcastle.



a potential southerly groundwater flow direction and with a groundwater mound present to the south of the onsite stormwater retention basin known as Lake Cochran Lake Cochran (**Figure 1** and **Figure 2 below**).



Figure 1. Site regional context.



Figure 2. May 2020 shallow aquifer water table elevations, potential groundwater flow direction and total PFAS concentrations.

The Tomago Sandbeds aquifer form an important water resource in the area. The low salinity groundwater combined with relatively shallow water table depth (mean depth 1.5 m below ground level) have, historically resulted in the extensive use of the resource as a stock watering, irrigation and drinking water supply.

There is a well-developed man-made surface waterway network within the Williamtown area. Site surface water runoff may discharge to two unnamed surface water channels; one channel discharges directly to Fullerton Cove and the other joins Dawsons Drain, approximately 650 metres from the Site's eastern boundary. Within the Base Lake Cochran acts as a stormwater collection point which also discharges to the off-Base Dawsons Drain and ultimately Fullerton Cove to the South. An extract from the Soil and Water Management Plan (SWMP) has been included as **Figure 3** below and shows the current mapping of the drainage network.

4 2022 QUARRYING ACTIVITIES SUMMARY

The subject land where the quarry is located occupies four land titles and has an area of 175 hectares (ha), with the quarry disturbance area occupying approximately 43 ha. Approximately 3.25 megatonnes of sand is planned to be quarried from elevated areas over a period of up to 15 years. Sand will be excavated from an elevation of 24 mAHD to an elevation no less than 0.7 metres above the highest estimated water table elevation. The anticipated minimum excavation elevations are approximately 5.6 mAHD in the north and 3.8 mAHD in the south.

Groundwater is not being extracted by the Site operators for quarrying operations, which rely on water sourced from Hunter Water. WSS have commenced a comprehensive groundwater and surface water monitoring program to monitor water levels and quality from the Site and to ensure that sand is not extracted from an elevation less than 0.7 metres above the maximum estimated water table elevation.

Various works have occurred at the Site throughout 2022 (see **Figure 1**). Quarrying operations continued to be carried out within Sector 7B. Proceeded by vegetation clearing and quarrying operations conducted in Sector 3 moving west and north into Sectors 3A, 3B, 4 and 4A. A wash plant was constructed within the central area of Sector 1 in July 2021. A second sand wash plant is being constructed in Sector 3 and quarrying and vegetation clearing operations have begun moving North through Sector 4. Sectors are shown on **Figure 1** below.





Figure 3. Elevation and drainage network of the project area and subject land in relation to surrounding lands.

5 SUMMARY OF PFAS INVESTIGATIONS IN THE WMA

PFAS contamination of surface water, groundwater, sediment and aquatic and terrestrial biota within and surrounding the Base has been reported by both the NSW EPA and DoD. A list of reports is available at www.defence.gov.au/environment/pfas/Williamtown/publications.asp.

The contamination is understood to have been the result of the use of aqueous film-forming foam used during firefighting and emergency response training. The known PFAS contamination sources at the Base are:

- Primary sources Fire station, two landfills and a disused fire training pit.
- Secondary sources Lake Cochran, the trade waste treatment plant (eastern Base area) and sewage treatment plant.
 - The trade waste treatment plant is not considered a possible source for PFAS contamination that may occur at the Site.

The surface soil samples collected outside the Base boundaries have been predominantly collected across the southern boundary, south of Lake Cochran and the sewerage treatment area. The PFOS + PFHxS concentrations, which generally make up approximately 90% of the total PFAS concentrations in the Williamtown Management Area, in the off-Base surface soil samples range between the laboratory limit of reporting (LOR), 0.2 and 375 micrograms per kilogram (μ g/kg). Two soil samples were collected between the Site and the Base's western boundary. The PFOS + PFHxS concentrations in soil were 0.5 and 0.7 μ g/kg, with the closest sample to the Site 350 metres northeast (1.3 km from the disused fire training pit (i.e., a primary PFAS source) and 1.1 km from a former landfill (i.e., a secondary PFAS source).

PFOS + PFHxS concentrations above the laboratory LOR (>0.2 to <10 μ g/L) have been observed in all surface water samples collected from channels that receive discharge from the Base. Based on the local drainage network, surface water is not considered a likely pathway for PFAS from the Base to the Site under normal flow conditions. However, backwash flooding is considered likely during high rainfall events and could impact upon the Site.

On- and off-Base PFAS groundwater investigations have focused on the Tomago Sandbeds aquifer with shallow and deep groundwater samples collected and analysed. This review focusses on PFAS concentrations in the shallow aquifer.

The 2020 groundwater Base PFAS monitoring results are summarised in **Figure 2** (above). PFOS + PFHxS concentrations above the laboratory LOR were observed to the south of Lake Cochran, beneath the disused fire training burn-pit, former landfill and current fire station and training pad. From the data reviewed it is evident that there is a groundwater mound to the south of Lake Cochran, suggesting the lake is providing groundwater recharge and is consistent with high PFOS + PFHxS concentrations observed down-gradient from the Lake.

The Site is not directly down-hydraulic gradient from any known primary or secondary Base PFAS source, as shown on **Figure 2**.

With regards to the Base groundwater fate and transport model, four "unidentified" PFAS sources (surface water, soil and or groundwater) located to the Site's south were identified. It is possible that one of these sources, located near the Cabbage Tree Road Dawsons Drain bridge, is associated with the Lake Cochran discharge. The other three low PFAS concentration occurrences are located to the Base's south and cannot be directly linked to the source at the Base. The three locations are:

- One Base groundwater monitoring well and three residential monitoring wells located on Cabbage Tree Road, directly south of the Site.
- Groundwater from a residential well located 550 metres to the Site's south.
- Groundwater from a residential well located to the south of lot DP629503. It is noted PFAS were not present above the laboratory LOR in a 2019 groundwater sample from MW139 located approximately 75 metres uphydraulic gradient from the residential well.

The PFAS groundwater fate and transport model estimated:

- The Base PFAS groundwater plume areas may expand through PFAS dispersion and diffusion.
- That by 2050:

- The disused fire training pit and former landfill plumes may merge, although it is noted that the merged plume is unlikely to intersect the Site's eastern boundary.
- The Lake Cochran PFAS plume should not intersect the Site's eastern boundary.
- The probable Lake Cochran sourced off-Base groundwater "unidentified" PFAS occurrence is beneath the Site's DP814078 parcel (eastern Site area) and has total PFAS concentrations between 0.01 and 0.07 µg/L.

6 SITE PFAS REVIEW

PFAS investigations commissioned by WSS at the Site have involved submission of soil, surface water and groundwater samples to a laboratory that has National Association of Testing Authorities (NATA) accreditation to determine PFAS concentrations in the submitted media. All laboratory results discussed in this report have been compared to the site-specific trigger values established in the Soil and Water Management Plan (SWMP, 2021). A QAQC schedule was also conducted as per NEPM guidelines for PFAS, where one duplicate and triplicate sample was taken for every ten primary samples.

Surface and groundwater sampling locations are shown on Error! Reference source not found. Error! Reference source not found. below.

6.1 Soil

Sixteen soil samples collected from ten bore holes between 7th and 17th December 2016 were submitted for PFAS analysis. The samples were all collected from elevated Site areas where sand quarrying is proposed to be undertaken. All samples, including two samples collected within the eastern Site area, i.e., closest to the Base were reported to have total PFAS concentrations below the laboratory LOR.

6.2 Surface Water

Surface water is monitored at four Site locations. Sixteen surface water samples collected from the four locations (SW01, SW02, SW03 & SW04) between January and December 2022 were submitted for PFAS analysis. During the 2022 monitoring period there was no reported results of PFAS compounds detected above the laboratory LOR in any surface water samples.

6.3 Groundwater

Groundwater samples were collected using high-density polyethylene (HDPE) HydraSleeves, with the samples transferred directly into laboratory supplied PFAS specific sample containers. The method is considered suitable for the collection of water samples as outlined in Approved methods for the sampling and analysis of water pollutants in NSW (EPA 2022).

Fourteen groundwater monitoring wells have been installed and either gauged or sampled at the Site (BH1 to BH12A). BH1 and BH12 were decommissioned in June and July of 2022, being replaced with BH1A and BH12A respectively in August 2022. Baseline results and inferred ground water elevation for these locations were taken from their respective predecessor wells until a baseline can be set. Furthermore, gauging of BH1A and BH12A was carried out for the remaining monitoring events after installation but no groundwater sampling will occur until the next annual monitoring round (February 2023).

MW239S, located within the DP629503 land parcel, was installed during the DoD investigations. Groundwater from the well was reported to have 0.03 μ g/L PFOS in March 2017, however, during WSS monitoring (sampled once in 2019, five times in 2020, 11 times in 2021 and 4 times in 2022) PFAS were below the laboratory LOR.

During the 2022 monitoring period, PFAS was sampled quarterly, with samples taken in February, May, August and November at all available wells as outlined in **Table 1**.

Monitoring Well ID	February	Мау	August	November
BH1	\checkmark			
BH2	~	\checkmark	~	~
BH4	\checkmark	\checkmark	~	~

Table 1: Monitoring Well locations Sampled for PFAS (2022)

Monitoring Well ID	February	Мау	August	November
BH5	~			
BH6	\checkmark	\checkmark	\checkmark	\checkmark
BH7	\checkmark	~	~	\checkmark
BH8	\checkmark	\checkmark	\checkmark	\checkmark
BH9A	\checkmark	~	~	\checkmark
BH11	\checkmark	\checkmark		\checkmark
BH12	\checkmark			
MW239S	~	\checkmark	\checkmark	\checkmark

Water Table Elevation

During the 2022 monitoring period, groundwater elevation increased to a maximum measured level in July and was higher than historically recorded elevations measured on the Site. There was an average increase of 0.6 m in groundwater elevation recorded when compared to the previous July 2021 levels. The water table elevation contours indicate a southeasterly groundwater flow direction, consistent with the 2019 and 2020 contours (Error! Reference source not found.).



Figure 4: Inferred Groundwater flow direction through the Site during April, July and October 2022

The floor of the quarry is based on maintaining a 0.7m buffer above the maximum predicted ground water level. There were thirty-two (32) instances of Trigger Action and Response Plan (TARP) trigger level exceedances during 2022, all occurring from March to December. This was following a rainfall total of 354mm in March 2022 and above average rainfall for much of the remainder of the year, recorded at the Williamtown RAAF weather station (# 61078). **Table 2** presents all TARP exceedances for 2022.

Location	TARP Level 1		TARP Level 2		TARP Level 3		
	Month	Depth below Max inferred GWE	Month	Depth below Max inferred GWE	Month	Distance above Max inferred GWE	Total Months Triggered
BH1 & BH1A	May & June	0.311 m and 0.429 m			July, September, October, November and December	0.304 m, 0.53 m, 0.534 m, 0.31m and 0.013 m	6
BH2	March, April, May, June and November	0.433 m, 0.385 m, 0.265 m, 0.428 m and 0.39 m	August, September, October	0.065 m, 0.129 m and 0.192 m	July	0.097 m	9
BH9	July and August	0.291 m and 0.4 m	-	-	-	-	2
BH9A	July	0.452 m	-	-	-	-	1
BH10	June and November	0.474 m and 0.3 m	Мау	0.24 m	August	0.091 m	4
BH11	March and December	0.39 m and 0.326 m	April, May, June, November	0.152 m, 0.075 m, 0.233 m and 0.05 m	July, September, October	0.337 m, 0.283 m and 0.26 m	8

Max inferred - the maximum inferred groundwater elevation based on historical ground water elevation data.

 It should be noted, quarry floor levels remained at least 0.166m above the groundwater table at all times and did not intercept groundwater. The nearest current quarry floor is located adjacent to BH1/BH1A. Given there was no interception of groundwater and groundwater is not contaminated, this resulted in no increased risk to on, or off-Site receptors.

In the long-term, groundwater rainfall recharge within the sands is likely to be relatively rapid. The removal of sand above the Site aquifer may result in short-term groundwater mounding, due to increased infiltration and lower evapotranspiration with the mound dissipating due to the high effective porosity of the sands. If a groundwater mound does form beneath the quarried areas, it would be unlikely to significantly change the groundwater flow direction and is more likely to result in producing a steeper off-Site hydraulic gradient. The likelihood that the quarrying would lead to increased groundwater flow from the Base to the Site area is very low.

Rainfall

Rainfall data was obtained from the Bureau of Meteorology (BOM) website for the Williamtown RAAF Base (Station Number 061078), approximately 4km from Site. Higher rainfall totals were recorded in 2022 (1472 mm) than the annual mean total (1127.6 mm). The majority of this rainfall occurred within the first five months of the year with the February-May consecutive period all recording above average rainfall, 292 mm greater than usually experienced this time of year.

This increased rainfall and the further above average rainfall recorded during July (327.4 mm), August (74.4 mm) and October (90.8 mm) raised the ground water elevations across the site from the previous years' already heightened results. It is possible that due to the above average rainfall there was an excess of surface and

groundwater flowing in a south easterly direction through the site that provided a buffer to PFAS compounds from the east of the site.

PFAS

During the baseline 2016 and 2017monitoring period, seven groundwater samples were analysed for PFAS with all concentrations reported below the laboratory LOR.

From the 2019 WSS monitoring, a PFDS equal to the LOR (0.02 μ g/L) was reported for BH4 groundwater, however, the concentration was below the laboratory LOR in follow-up samples.

Between January and December 2020, groundwater samples from ten monitoring wells (total = 68 samples) were submitted to the laboratory for PFAS concentration determination. One groundwater sample from BH9 (August) was reported to have a total PFAS concentration of 0.14 μ g/L, with all other samples below the laboratory LOR. The PFAS above the LOR was 6:2 FTS.

6:2 FTS is rarely above the laboratory LOR for the samples collected during the Base water monitoring program (37 out of 176 groundwater samples had low 6:2 FTS concentrations (<0.34 μ g/L) and four out of 27 surface water samples had low 6:2 FTS concentrations (<0.35 μ g/L)) during the 2020 DoD monitoring.

In 2021, 87 Site groundwater samples were submitted to the laboratory for PFAS analysis, with one sample (BH4) reported to have PFAS above the LOR; 0.15 μ g/L 6:2 FTS in the November 2021 groundwater monitoring event.

During the 2022 monitoring program a total of 34 Site groundwater samples were submitted to the laboratory for PFAS analysis. With two samples both taken on the 24 of February from BH4 and BH12 reporting 6:2 FTS concentrations marginally above the laboratory LOR (0.05 μ g/L) with 0.06 μ g/L and 0.07 μ g/L respectively.

Groundwater Summary

In summary:

- The increase in water table elevation is a consequence of the above average rainfall for most months after February 2022
- 2022 water table elevations are higher than in previous years. In particular, there was 32 instances where TARP Trigger Levels were exceeded with ten (10) of these being Level 3 exceedances above predicted maximums at BH1/BH1A, BH2, BH10 and BH11
- The potential groundwater flow direction is consistent with the observed 2020 and 2021 directions.
- A low 6:2 FTS concentration was reported in groundwater samples from BH4 and BH12 in February. Low 6:2 FTS concentrations have previously been reported in groundwater samples from BH4 (0.15 µg/L November 2021) BH6 (0.19 µg/L, December 2019) BH9 (0.14 µg/L, August 2020). 6:2 FTS is not a COPC at the Base and is therefore unlikely to represent PFAS migration from the Base.

6.4 Wash Plant Samples

With the approval of a Wash Plant addition to the quarry, a condition of the approval included monitoring for PFAS within the wash plant water and sediment. To provide a greater understanding of PFAS distribution at the Site, the wash plant water (WPW) and wash plant sediment fines (WPF) were submitted to the laboratory for PFAS analysis on a quarterly basis. The laboratory results are summarised below:

- Wash plant water output samples were collected monthly from January to December:
 - PFOA concentrations in samples collected in November and December recorded 0.01 µg/L (laboratory LOR = 0.01 µg/L). The concentrations are below the adopted criteria (0.07 µg/L).
 - PFHxS concentrations in samples collected in February, June, October, November and December were 0.01 µg/L, 0.01 µg/L, 0.01 µg/L, 0.02 µg/L and 0.01 µg/L respectively (laboratory LOR = 0.01 µg/L)
 - PFOS concentrations in samples collected in January, July, October, November and December were 0.03 µg/L, 0.02 µg/L, 0.02 µg/L, 0.02 µg/L and 0.02 µg/L respectively (laboratory LOR = 0.01 µg/L)
- Four wash plant fines samples (comprising silt and organic particles) were collected from the plant between February and November 2022.
 - PFPeA concentration in a sample collected in February was 0.0002 mg/kg (laboratory LOR = 0.0002 mg/kg)

- PFOS detected in three samples February, May and August 0.001 mg/kg, 0.0012 mg/kg and 0.0006 mg/kg respectively, remaining below the site-specific trigger values.
- All PFAS compounds were below the LOR in November 2022.

Based on the wash plant waste (fines) sample results, a minor PFAS source within the wash plant could be considered. However, it is also likely that low PFAS concentrations within wash plant inputs are concentrated on the silt and organic material.

7 DOD HUMAN HEALTH RISK ASSESSMENT REVIEW

In 2016 the DoD engaged AECOM to undertake an off-Base human health risk assessment (HHRA). The off-Base HHRA was updated in 2017. A summary of the findings of the updated HHRA and relevance to the Site area are provided below.

The HHRA evaluated the potential health risks in the Williamtown area to residents (including recreational and commercial fishers and beef farmers) and non-residents (commercial fishers, council workers and visitors) from exposure to PFAS under both typical and upper exposure scenarios. The exposure scenarios are:

- Typical exposure scenario:
 - Representative of PFAS concentrations that a general or average receptor is likely to be exposed. This
 is applicable to the majority of the population.
- Upper exposure scenario:
 - Calculated based on the PFAS concentration upper 95th percentile in the relevant media and is applicable for receptors that may be in close proximity to media with elevated PFAS concentrations within a localised area, such as a residential groundwater well.
 - The upper exposure scenario is considered suitable for quarry workers who would have a generally high risk though ingestion (incidental and via inhalation) and residents near the quarry.

Based on the Stage 2B investigation outcomes the HHRA divided the off-Base areas into zones based on the potential risk that PFAS posed. The Site's local area was designated Risk Zone C (low risk), with the risk zone encompassing the entire eastern Site area and the southern proposed extraction area. For reference the northern extraction area is not within an identified risk zone.

The HHRA determined risks for Risk Zone C upper exposure scenarios (pathways) are:

- Ingestion and contact with groundwater acceptable.
- Dermal contact with soil and Ingestion of soil and dust acceptable.
- Consumption of homegrown eggs elevated.
- Consumption of locally grown fruit and vegetables acceptable.
- Incidental ingestion of surface water elevated.
- Surface water contact acceptable.
- Incidental ingestion and contact with sediment acceptable.
- Consumption of beef and milk elevated.

7.1 Relevance of Potential On- and Off-Site Exposures

The HHRA determined potential exposure pathways listed above are considered suitable for off-Site residents and on-Site quarry personnel. For nearby residents and quarry personnel, the comparison of the HHRA upper exposure scenario is considered conservative:

- For dust inhalation/soil ingestion because:
 - PFAS have not been reported above the laboratory limit of reporting in soil samples.
 - Dust mitigation measures are required during quarrying activities.
- For groundwater exposure because:
 - The quarry base will not extend to a depth closer than 0.7 metres to the highest estimated water table elevation, hence groundwater management will not be required and groundwater discharge to surface water as a result of quarrying activities will not occur.

- PFAS have essentially not been identified above the laboratory LOR in Site groundwater, hence PFAS
 present in groundwater from nearby residential wells is unlikely to have been sourced from the Site and
 may be diluted by Site derived groundwater.
- The designation of Risk Zone C in the Site area was partially based on a very low PFOS concentration from one well, a concentration that was not subsequently repeated.
- Groundwater migration from the Base is unlikely to reach the eastern property before 2050, by which time quarrying operations will have ceased and any complete PFAS migration pathways will be unlikely.
- While SW1 and SW4 are both down gradient of the Site and PFAS was reported above the LOR, the hydraulic connection via surface water is limited due to high infiltration.

Based on the above, the potential for increased PFAS exposure to residents resulting from quarrying activities is considered unlikely.

8 CONCLUSIONS

A review of the currently available information regarding the PFAS contamination originating from the Base and assessed Site derived soil, groundwater and surface water data was undertaken to determine whether quarrying operations will increase the PFAS exposure to nearby residents.

During 2022, sand quarrying activities were ongoing at the Site and expanded into the northern Site area. Construction of a new sand wash plant in this northern section begun in December 2022.

Considering the information reviewed, the following is concluded:

- Base-sourced PFAS is and has historically been unlikely to be transported to the Site via wind, surface
 water or groundwater the Site does not appear to have received PFAS from the Base and does not appear
 to be acting as a local tertiary PFAS source.
- PFAS was not detected in surface waters during 2022.
- The higher-than-average rainfall measured during 2022 had great impact upon ground water elevations during this year, and a probable positive impact on surface water PFAS concentrations buffering outside movements of contaminates onto the site
- The water table exceeded the maximum inferred water level at five locations ten separate times this year. With 32 total occasions of TARP level exceedances. However, the groundwater level remained at least 0.166 m below the base of quarry operations meaning that any potentially contaminated groundwater did not breach the surface.
 - The regular PFAS detections within the wash plant fines requires further investigation to determine source and suitability of material if used or offsite (including the PFAS TCLP requirements).

9 RECOMMENDATIONS

Development of a numerical groundwater flow model that allows for the effects of increased infiltration in the sand extraction areas to be quantitatively assessed should be considered.

The PFAS detections within the wash plant fines requires further investigation of the source of the PFAS and to determine the suitability of material for reuse onsite or offsite (including the PFAS leach testing).

If you require additional information or clarification, please contact the undersigned at +61 (0) 457 426 013. This report should be read in conjunction with the Kleinfelder Statement of Limitations (attached).

Sincerely,

Elaine Spence

Kleinfelder Australia Pty Ltd

Principal Environmental Scientist

Contaminated Land Management



Elaine is a Certified Environmental Practitioner (Site Contamination Specialist) #1478



KLEINFELDER STATEMENT OF LIMITATIONS

This report has been prepared by Kleinfelder Australia Pty Ltd (Kleinfelder) and may be used only by the Client and its designated representatives or relevant statutory authorities and only for the purposes stated for this specific engagement within a reasonable time from its issuance, but in no event later than two (2) years from the date of the report.

This work was performed in a manner consistent with that level of care and skill ordinarily exercised by other members of Kleinfelder's profession practicing in the same locality, under similar conditions and at the date the services are provided. Our conclusions, opinions, and recommendations are based on a limited number of observations and data. It is possible that conditions could vary between or beyond the data evaluated. Kleinfelder makes no other representation, guarantee, or warranty, express or implied, regarding the services, communication (oral or written), report, opinion, or instrument of service provided.

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The findings and conclusions contained within this report are relevant to the conditions of the site and the state of legislation currently enacted in the relevant jurisdiction in which the site is located as at the date of this report.

Additionally, the findings and conclusions contained within this report are made following a review of certain information, reports, correspondence and data noted by methods described in this report including information supplied by the client or its assigns. Kleinfelder has designed and managed the program for this report in good faith and in a manner that seeks to confirm the information provided and test its accuracy and completeness. However, Kleinfelder does not provide guarantees or assurances regarding the accuracy, completeness and validity of information and data obtained from these sources and accepts no responsibility for errors or omissions arising from relying on data or conclusions obtained from these sources.

Any representation, statement, opinion or advice expressed or implied in this report is made on the basis that Kleinfelder, its agents and employees are not liable to any other person taking or not taking (as the case may be) action in respect of any representation, statement, opinion or advice referred to above.






APPENDIX 13. TRUCK MONITORING RECORDS



January 2022

Monthly S	Summa	ry of Traffic Movem	ents
(as per l	Conditior	1 26 of Consent SSD_6125)
Date	Total	Approved Maximum*	Percentage of Approved Movements
4-Jan	5	116	4.3%
5-Jan	9	116	7.8%
6-Jan	10	116	8.6%
7-Jan	11	116	9.5%
10-Jan	29	116	25.0%
11-Jan	30	116	25.9%
12-Jan	20	116	17.2%
13-Jan	24	116	20.7%
14-Jan	14	116	12.1%
17-Jan	33	116	28.4%
18-Jan	32	116	27.6%
19-Jan	21	116	18.1%
20-Jan	16	116	13.8%
21-Jan	22	116	19.0%
22-Jan	7	90	7.8%
24-Jan	36	116	31.0%
25-Jan	27	116	23.3%
27-Jan	23	116	19.8%
28-Jan	25	116	21.6%
29-Jan	2	90	2.2%
31-Jan	35	116	30.2%
Total trucks this month	431		
Approved maximum for month*		2654	16.2%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



February 2022

Monthly S	umma	ry of Traffic Movem	ients
(as per (Conditior	n 26 of Consent SSD_6125)
Date	Total	Approved Maximum*	Percentage of Approved Movements
1-Feb	32	116	27.6%
2-Feb	40	116	34.5%
3-Feb	17	116	14.7%
4-Feb	22	116	19.0%
5-Feb	3	90	3.3%
7-Feb	23	116	19.8%
8-Feb	30	116	25.9%
9-Feb	41	116	35.3%
10-Feb	36	116	31.0%
11-Feb	38	116	32.8%
12-Feb	7	90	7.8%
14-Feb	36	116	31.0%
15-Feb	42	116	36.2%
16-Feb	34	116	29.3%
17-Feb	45	116	38.8%
18-Feb	24	116	20.7%
19-Feb	7	90	7.8%
21-Feb	27	116	23.3%
22-Feb	27	116	23.3%
23-Feb	29	116	25.0%
24-Feb	24	116	20.7%
25-Feb	19	116	16.4%
26-Feb	4	90	4.4%
28-Feb	35	116	30.2%
Total trucks this month	642		
Approved maximum for month*		2680	24.0%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



March 2022

Monthly Summary of Traffic Movements			
(as per 0	Conditior	a 26 of Consent SSD_6125)
Date	Total	Approved Maximum*	Percentage of Approved Movements
1-Mar	15	116	12.9%
2-Mar	14	116	12.1%
3-Mar	7	116	6.0%
4-Mar	10	116	8.6%
5-Mar	1	90	1.1%
7-Mar	20	116	17.2%
8-Mar	18	116	15.5%
9-Mar	17	116	14.7%
10-Mar	25	116	21.6%
11-Mar	33	116	28.4%
12-Mar	6	90	6.7%
14-Mar	43	116	37.1%
15-Mar	37	116	31.9%
16-Mar	33	116	28.4%
17-Mar	31	116	26.7%
18-Mar	18	116	15.5%
19-Mar	15	90	16.7%
21-Mar	58	116	50.0%
22-Mar	35	116	30.2%
23-Mar	33	116	28.4%
24-Mar	26	116	22.4%
25-Mar	15	116	12.9%
26-Mar	4	90	4.4%
28-Mar	23	116	19.8%
29-Mar	9	116	7.8%
30-Mar	10	116	8.6%
31-Mar	26	116	22.4%
Total trucks this month	582		
Approved maximum for month*		3028	19.2%

 Maximum approved naulage as per Condition 23 of Colline - 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



April 2022

Monthly S	Summa	ry of Traffic Movem	ients
(as per l	Conditio	n 26 of Consent SSD_6125)
Date	Total	Approved Maximum*	Percentage of Approved Movements
1-Apr	14	116	12.1%
2-Apr	3	90	3.3%
4-Apr	34	116	29.3%
5-Apr	36	116	31.0%
6-Apr	39	116	33.6%
7-Apr	48	116	41.4%
8-Apr	40	116	34.5%
9-Apr	3	90	3.3%
11-Apr	33	116	28.4%
12-Apr	36	116	31.0%
13-Apr	39	116	33.6%
14-Apr	34	116	29.3%
19-Apr	42	116	36.2%
20-Apr	34	116	29.3%
21-Apr	26	116	22.4%
22-Apr	30	116	25.9%
23-Apr	3	90	3.3%
26-Apr	35	116	30.2%
27-Apr	30	116	25.9%
28-Apr	47	116	40.5%
29-Apr	29	116	25.0%
30-Apr	2	90	2.2%
Total trucks this month	637		
Approved maximum for month*		2886	22.1%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



May 2022

Monthly Summary of Traffic Movements				
(as per Condition 26 of Consent SSD_6125)				
Date	Total	Approved Maximum*	Percentage of Approved Movements	
2-May	31	116	26.7%	
3-May	52	116	44.8%	
4-May	44	116	37.9%	
5-May	49	116	42.2%	
6-May	23	116	19.8%	
7-May	7	90	7.8%	
9-May	49	116	42.2%	
10-May	38	116	32.8%	
11-May	50	116	43.1%	
12-May	64	116	55.2%	
13-May	24	116	20.7%	
14-May	2	90	2.2%	
16-May	37	116	31.9%	
17-May	33	116	28.4%	
18-May	48	116	41.4%	
19-May	48	116	41.4%	
20-May	45	116	38.8%	
21-May	7	90	7.8%	
23-May	44	116	37.9%	
24-May	29	116	25.0%	
25-May	35	116	30.2%	
26-May	26	116	22.4%	
27-May	43	116	37.1%	
28-May	8	90	8.9%	
30-May	42	116	36.2%	
31-May	55	116	47.4%	
Total trucks this month	933			
Approved maximum for month*		2912	32.0%	

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



June 2022

Monthly Summary of Traffic Movements				
(as per Condition 26 of Consent SSD_6125)				
Date	Total	Approved Maximum*	Percentage of Approved Movements	
1-Jun	61	116	52.6%	
2-Jun	77	116	66.4%	
3-Jun	68	116	58.6%	
4-Jun	4	90	4.4%	
6-Jun	60	116	51.7%	
7-Jun	49	116	42.2%	
8-Jun	55	116	47.4%	
9-Jun	79	116	68.1%	
10-Jun	87	116	75.0%	
11-Jun	6	90	6.7%	
14-Jun	55	116	47.4%	
15-Jun	47	116	40.5%	
16-Jun	60	116	51.7%	
17-Jun	68	116	58.6%	
18-Jun	15	90	16.7%	
20-Jun	47	116	40.5%	
21-Jun	48	116	41.4%	
22-Jun	53	116	45.7%	
23-Jun	42	116	36.2%	
24-Jun	64	116	55.2%	
25-Jun	12	90	13.3%	
27-Jun	50	116	43.1%	
28-Jun	55	116	47.4%	
29-Jun	64	116	55.2%	
30-Jun	70	116	60.3%	
Total trucks this month	1296			
Approved maximum for month*		2912	44.5%	

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



July 2022

Monthly Summary of Traffic Movements					
(as per C	(as per Condition 26 of Consent SSD_6125)				
Date	Total	Approved Maximum*	Percentage of Approved Movements		
1-Jul	57	116	49.1%		
2-Jul	4	90	4.4%		
4-Jul	60	116	51.7%		
5-Jul	65	116	56.0%		
6-Jul	54	116	46.6%		
7-Jul	18	116	15.5%		
8-Jul	52	116	44.8%		
9-Jul	10	90	11.1%		
11-Jul	43	116	37.1%		
12-Jul	45	116	38.8%		
13-Jul	35	116	30.2%		
14-Jul	40	116	34.5%		
15-Jul	44	116	37.9%		
16-Jul	9	90	10.0%		
18-Jul	47	116	40.5%		
19-Jul	56	116	48.3%		
20-Jul	50	116	43.1%		
21-Jul	52	116	44.8%		
22-Jul	42	116	36.2%		
23-Jul	5	90	5.6%		
25-Jul	47	116	40.5%		
26-Jul	44	116	37.9%		
27-Jul	43	116	37.1%		
28-Jul	56	116	48.3%		
29-Jul	64	116	55.2%		
30-Jul	8	116	6.9%		
Total trucks this month	1050				
Approved maximum for month*		2886	36.4%		

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



August 2022

Monthly Summary of Traffic Movements				
(as per Condition 26 of Consent SSD_6125)				
Date	Total	Approved Maximum*	Percentage of Approved Movements	
1-Aug	49	116	42.2%	
2-Aug	74	116	63.8%	
3-Aug	81	116	69.8%	
4-Aug	84	116	72.4%	
5-Aug	79	116	68.1%	
6-Aug	12	116	10.3%	
8-Aug	56	116	48.3%	
9-Aug	45	116	38.8%	
10-Aug	42	116	36.2%	
11-Aug	42	116	36.2%	
12-Aug	42	116	36.2%	
13-Aug	8	116	6.9%	
15-Aug	71	116	61.2%	
16-Aug	59	116	50.9%	
17-Aug	60	116	51.7%	
18-Aug	55	116	47.4%	
19-Aug	44	116	37.9%	
20-Aug	10	116	8.6%	
22-Aug	48	116	41.4%	
23-Aug	41	116	35.3%	
24-Aug	51	116	44.0%	
25-Aug	58	116	50.0%	
26-Aug	57	116	49.1%	
27-Aug	13	116	11.2%	
29-Aug	69	116	59.5%	
30-Aug	68	116	58.6%	
31-Aug	82	116	70.7%	
Total trucks this month	1400			
Approved maximum for month*		2912	48.1%	

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



September 2022

Monthly Summary of Traffic Movements				
(as per Co	(as per Condition 26 of Consent SSD_6125)			
Date	Total	Approved Maximum*	Percentage of Approved Movements	
1-Sep	67	116	57.8%	
2-Sep	59	116	50.9%	
3-Sep	20	90	22.2%	
5-Sep	79	116	68.1%	
6-Sep	76	116	65.5%	
7-Sep	79	116	68.1%	
8-Sep	64	116	55.2%	
9-Sep	61	116	52.6%	
10-Sep	12	90	13.3%	
12-Sep	70	116	60.3%	
13-Sep	64	116	55.2%	
14-Sep	76	116	65.5%	
15-Sep	75	116	64.7%	
16-Sep	54	116	46.6%	
17-Sep	16	90	17.8%	
19-Sep	44	116	37.9%	
20-Sep	66	116	56.9%	
21-Sep	56	116	48.3%	
23-Sep	64	116	55.2%	
24-Sep	1	90	1.1%	
26-Sep	58	116	50.0%	
27-Sep	54	116	46.6%	
28-Sep	40	116	34.5%	
29-Sep	45	116	38.8%	
30-Sep	40	116	34.5%	
Total trucks this month	1340			
Approved maximum for month*		2912	46.0%	

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



October 2022

Monthly Summary of Traffic Movements			
(as per Co	onditior	1 26 of Consent SSD_6125	
Date	Total	Approved Maximum*	Percentage of Approved Movements
4-Oct	97	116	83.6%
5-Oct	96	116	82.8%
6-Oct	87	116	75.0%
7-Oct	73	116	62.9%
8-Oct	4	90	4.4%
10-Oct	63	116	54.3%
11-Oct	86	116	74.1%
12-Oct	62	116	53.4%
13-Oct	64	116	55.2%
14-Oct	68	116	58.6%
15-Oct	11	90	12.2%
17-Oct	50	116	43.1%
18-Oct	63	116	54.3%
19-Oct	65	116	56.0%
20-Oct	74	116	63.8%
21-Oct	48	116	41.4%
22-Oct	3	90	3.3%
24-Oct	35	116	30.2%
25-Oct	36	116	31.0%
26-Oct	59	116	50.9%
27-Oct	56	116	48.3%
28-Oct	65	116	56.0%
29-Oct	16	90	17.8%
31-Oct	75	116	64.7%
Total trucks this month	1356		
Approved maximum for month*		2886	47.0%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



November 2022

Monthly Summary of Traffic Movements			
(as per Co	onditior	a 26 of Consent SSD_6125)	
Date	Total	Approved Maximum*	Percentage of Approved Movements
1-Nov	99	116	85.3%
2-Nov	100	116	86.2%
3-Nov	82	116	70.7%
4-Nov	83	116	71.6%
5-Nov	9	90	10.0%
7-Nov	76	116	65.5%
8-Nov	58	116	50.0%
9-Nov	79	116	68.1%
10-Nov	66	116	56.9%
11-Nov	82	116	70.7%
12-Nov	17	90	18.9%
14-Nov	75	116	64.7%
15-Nov	81	116	69.8%
16-Nov	76	116	65.5%
17-Nov	72	116	62.1%
18-Nov	69	116	59.5%
19-Nov	31	90	34.4%
21-Nov	92	116	79.3%
22-Nov	71	116	61.2%
23-Nov	110	116	94.8%
24-Nov	77	116	66.4%
25-Nov	73	116	62.9%
26-Nov	15	90	16.7%
28-Nov	65	116	56.0%
29-Nov	79	116	68.1%
30-Nov	82	116	70.7%
Total trucks this month	1819		
Approved maximum for month*		2912	62.5%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



December 2022

Monthly Summary of Traffic Movements			
(as per Co	ondition	1 26 of Consent SSD_6125)	
Date	Total	Approved Maximum*	Percentage of Approved Movements
1-Dec	76	116	65.5%
2-Dec	63	116	54.3%
3-Dec	35	90	38.9%
5-Dec	74	116	63.8%
6-Dec	77	116	66.4%
7-Dec	73	116	62.9%
8-Dec	80	116	69.0%
9-Dec	89	116	76.7%
10-Dec	19	90	21.1%
12-Dec	79	116	68.1%
13-Dec	88	116	75.9%
14-Dec	84	116	72.4%
15-Dec	85	116	73.3%
16-Dec	101	116	87.1%
17-Dec	21	90	23.3%
19-Dec	81	116	69.8%
20-Dec	102	116	87.9%
21-Dec	81	116	69.8%
22-Dec	66	116	56.9%
23-Dec	25	116	21.6%
Total trucks this month	1300		
Approved maximum for month*	1355	3002	46.6%

* Maximum approved haulage as per Condition 23 of Consent SSD_6125:

- 6 trucks per hour from 6am to 7am Monday to Friday.

- 10 trucks per hour from 7am to 6pm Monday to Friday.

- 10 trucks per hour from 7am to 4pm on Saturday.

- No haulage on Public Holidays.



APPENDIX 14. PEST ANIMAL CONTROL REPORT

APEX ENVIRO SOLUTIONS PTY LTD REPORT



PEST ANIMAL CONTROL REPORT – NEWCASTLE SAND OPERATIONS 4TH November 2022

Firstly, we would like to thank Elliot from Newcastle Sand for his assistance whilst carrying out this work. Two fox dens were located just off the entrance road to the Newcastle Sand operations area, with the resident foxes predating upon both neighbours chooks and the resident wildlife population. Several dead animal carcasses were located in and around the dens which included possums, birds, bandicoots, a snake and multiple chickens.

Fumigation was undertaken to clear the dens and remove the problem foxes causing the issues. Dencofume was used to carry out this process, with one canister applied to each hole which is then collapsed and filled over to allow the product to do its job. Holes were then reinspected several hours later to ensure there was no residual fire risk from the canisters and then once again 1 week later to ensure the holes hadn't been reestablished. No further activity was recorded on these holes indicating that a successful control outcome had occurred, and the problem foxes had been removed from the local environment. It is believed there was both adult and juvenile foxes present at the den sites.

Please see photos of the program attached below on the following pages.











Report prepared and photos by Ross Garland Apex Enviro Solutions Pty Ltd 10th February 2023



APPENDIX 15. BIANNUAL REHABILITATION FLORA MONITORING



28 February 2023

Quarry Manager Newcastle Sand Pty Ltd 398 Cabbage Tree Road Williamtown NSW 2318

 Attention:
 Eliot Laver

 Sent by email to:
 eliot@newcastlesand.com.au

SUBJECT: Biannual Rehabilitation Flora Monitoring

Dear Eliot,

On the 28 November 2022, Nigel Fisher of Wedgetail Project Consulting attended site to conduct the first round of flora monitoring on the rehabilitation of areas 3A, 7B and 7C (Figure 1). Monitoring was conducted in accordance with the Biodiversity and Rehabilitation Management Plan (BRMP) Section 8.3 Bi-annual Monitoring as follows:

Each sector will have points overlaid in a grid fashion at approximately 15 m intervals using a GIS program; these points represent a single sample plot, each $2 \times 2 \text{ m} (4 \text{ m}^2)$. The plot points will be confirmed in the field during the first monitoring event, to ensure each point occurs within the extraction area. These confirmed points will be retained and used for following monitoring events until completion after 3 years.

The pre-confirmed 2×2 m quadrat locations will be uploaded on to hand-held GPS unit and a qualified ecologist will visits each of these quadrat locations using the GPS. Once the point is located, four 2 m poles will be laid on the ground around the point to define the sample area and the data outlined in **Table 1** will be collected at each point.

Parameter	Details	Description		
Species richness	The total number of different species of plant present.	A measure of biodiversity/ species composition		
Abundance	The total number of each species present.	A measure of plant/ species density.		
	The total number of Camfield's Stringybark individuals	A measure of the number of individuals per sector		
Height	The average height of all plants in the plot.	An indicator of overall growth.		
Percentage cover	An estimate of the total plot area having plant cover-percentage of area.	A measure of the total green cover for the rehabilitation area.		

Table 1: Details of data collected at each survey.

PO Box 234 Cardiff, NSW 2285 ABN: 93 640 388 683



In addition, a minimum of four permanent photo-monitoring points will be established in each sector.

The results of this monitoring are presented below. If you have any questions, please do not hesitate to contact me.

Yours Sincerely,

Nigel Fisher Senior Ecologist M: 0407 657 583 nfisher@wedgetail.com.au



1. MONITORING RESULTS

Three sectors were monitored, Sector 3A, 7B and 7C. Results are presented for sectors 3a and 7B. Sector 7C was very young rehabilitation and only a single 2m x 2m plot recorded vegetation. Monitoring in March 2023 will be conducted and the vegetation is expected to have increased coverage and size.

1.1 SECTOR 3A

There was a total of 38 - 2m x 2m plots monitored for this survey. Average results are provided in **Table 2**. As can be seen numbers were very low, with plants being very young and only sparse in their distribution.

Table 2: Sector 3A monitoring results for 2m x 2m plots.

Ave. Total Species	Ave. Total Plants	Ave. Height (cm)	Ave. Estimated Cover (%)
6.7	12.7	18.4	3.6

There were 28 individual species were recorded in this sector. The majority of these were shrubs – 69%, with ground stratum species accounting for 28% and canopy species 3%. There were no species from the midstorey stratum.

Key species (as per Table 9 in the BRMP) recorded included *Acacia longifolia, A. ulicifolia, Actinotus helianthi, Dillwynia retorta, Hibbertia linearis, Lomandra glauca* and *Lomandra longifolia.* Key canopy species recorded were *Angophora costata* and *Corymbia gummifera.*

Monitoring photos from the photo points show that this sector was in the very early stages of rehabilitation at the time of the survey (**Plate 1** and **Plate 2**).







Plate 1: Sector 3A monitoring photos. Top PP1 looking SE, Bottom PP2 looking NE







Plate 2: Sector 3A monitoring photos. Top PP3 looking SW, Bottom PP4 looking NW

1.2 SECTOR 7B

A total of 36 – 2m x 2m plots were surveyed in this sector. Average results are presented in **Table 3** below. When compared to Sector 3A, it can be seen that average species, aver total plants and average cover are slightly improved. A total of 36 species were recorded, of which 77% were shrubs, with 22% ground stratum, >1% midstorey stratum (i.e., a single species *Leptospermum polygalifolium*), with 1% canopy species (i.e., two species, *Angophora costata* and a very young *Eucalyptus* stem recorded as unidentified.

Table 3: Sector 7B monitoring results for 2m x 2m plots.

Ave. Total Species	Ave. Total Plants	Ave. Height (cm)	Ave. Estimated Cover (%)
8.1	21.5	12.9	4.3

Ten of the twenty species (as per the BRMP) recorded were key species and in addition to the canopy species above included, *Acacia longifolia, Acacia ulicifolia, Actinotus helianthi, Bossiaea heterophylla, Dillwynia retorta, Hibbertia linearis, Lomandra longifolia* and *Ricinocarpos pinifolius.* Photo monitoring points of Sector 7B show that the revegetation is more advanced with vegetation growing along the haul road on the edge of the revegetation area (**Plate 3** and **Plate 4**). **Plate 5** shows the extent of the woody debris and the start of the natural revegetation, which is shown in more detail in **Plate 6**.





Plate 3: Sector 7B monitoring photo. PP1 looking due north.



Plate 4: Expanded view of Sector 7B PP1. Note the *Acacia longifolia* sprouting along the edge of the haul road.





Plate 5: Sector 7B monitoring photos. Top, PP2 looking due west. Bottom PP3 looking SE. Note the small plants in the foreground.





Plate 6: Sector 7B PP 3 close up showing the extent of the native flora in this sector.

1.3 SECTOR 7C

This sector was walked over to ascertain the stage of rehabilitation. Only a single plot recorded any vegetation. Two photo monitoring points were established which clearly demonstrate that vegetation had not yet germinated, and the next monitoring event would provide data for assessment (**Plate 7**)



Plate 7: Sector 7C showing this lack of vegetation at this early stage of rehabilitation



2. DISCUSSION AND RECOMMENDATIONS

Given the every early stage of the revegetation the results are promising with a considerable number of species recorded, including many of the key species. A lack of midstorey and only a few canopy species is an issue that can be rectified by the installation of tubestock. At the time of writing, seed collection had been undertaken and seven species of *Eucalyptus* plus *Banksia serrata* had been sent to nurseries for propagation. The species selected were *A. costata, C. gummifera, E. globoidea, E. parramattensis, E. pilularis, E. piperita* and *E. signata.* These will be installed in the rehabilitation areas when suitably mature to increase the density and diversity of these strata. Seed collection of *E. camfieldii* should be prioritised to allow for propagation and installation of this species. The proximity of the remnant vegetation will also assist with the overhanging canopy able to colonise via self-seeding.

A further recommendation is to use the monitoring data to guide seed collection for any key species that have not been recorded in the revegetation. Intis regards, seed collection should include further midstorey species to overcome their paucity (to date) in the revegetation. The propagation *B. serrata* will go part way to alleviate this issue, six other species are listed for this strata in the BRMP and could be targeted.

With regards to the Performance Criteria stipulated in Section 9.1 of the BRMP, the rehabilitation is on track for Year 1 criteria or corrective actions -i.e., propagation of tubestock including key canopy species is underway.

Year of rehabilitation	Overall Rehabilitation Objectives	Aims for each Rehabilitation Year	Performance Criteria	Achievement Against Criteria
Tehabilitation 1.	 Progressive rehabilitation, revegetation with original vegetation community type, or similar, ensuring structural components and dominant species of vegetation, comparable with pre-extraction vegetation at similar elevations; free of significant weeds. 	 Rehabilitation Year Topsoil stabilised by primary colonisers (e.g., <i>Acacias</i> & pea species). Key species present, including tree species important for Koalas and Camfield's Stringybark. 	 Early pioneer stage appearing: Small seedlings (< 5 cm) regenerating from topsoil, < 5% surface cover. Brush-matting evident. Woody debris (>10 cm diameter) does not exceed 20% of the ground surface cover. Local seed has been collected and is stored appropriately for direct seeding or 	 Achieved Achieved Achieved Achieved Achieved
			h h . 2	

Table 4: Relevant section of Performance Criteria table from the BRMP