SIBELCO AUSTRALIA

2018 Annual Environmental Management Report

Tanilba Northern Dune

TITLE BLOCK

AEMR Period Commencement	1st April 2017
AEMR Period Completion	31st March 2018
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1. INTRODUCTION

1.1. Scope

This Annual Environmental Management Report (AEMR) has been prepared for the Tanilba Northern Dune, to report on mining activities undertaken during the past 12 month reporting period from 1st April 2017 to 31st of March 2018. This report addresses the site's present compliance obligations and status, activities of the past twelve-month reporting period, and the proposed activities for the following 12 months.

This AEMR encompasses the annual reporting requirements required by the following approvals:

- Project Approval MP09_0091 - issued by the Department of Planning and Environment;
- Hunter Water (Special Areas) Regulations 1997 approval under Clause 13 (1) - issued by the Department of Land and Water Conservation; and
- Hunter Water Regulation 2010 approval under Clause 10(1) - issued by the Department of NSW Trade and Investment.

It is important to note, during this AEMR reporting period that mining activities took place exclusively within the Northern Extension Lots 11 – 13 on DP 408240. Therefore, this report primarily addresses the environmental obligations pertaining to Project Approval MP 09_0091.

This AEMR will be circulated to:

- NSW Department of Planning and Environment (DPE)
- Hunter Water Corporation (HWC)
- Port Stephens Shire Council
- NSW Office of Water (DPI)
- Sibelco engaged environmental contractors
- Sibelco management

1.2. Background Information and Mining History

The Tanilba Northern Dune is an elevated sand dune situated on the eastern side of Oyster Cove Road, adjacent to the township of Oyster Cove in the Port Stephens Shire, New South Wales. The approved extraction areas in relation to the regional context can be seen in Figure 1.

White silica sand has been extracted from Northern Dune by several companies at different locations since 1991. Sibelco commenced mining in 2004 and is currently extracting from what is known as the Northern Dune Extension or Lots 11 – 13. Mining commenced in this area in 2016.

Prior to 2003, the western parts of the northern dune were mined by ACI Operations Ltd. Areas that have been mined by Sibelco since 2005 can be seen below in Figure 2.

The approved extraction areas of the Tanilba Northern Dune are comprised of four areas separated jurisdictionally by Crown Lands, Hunter Water (x2) & Department of Planning and Environment approvals, as depicted in Figure 3. The following list summarises when areas were approved for mining:

- 8/07/2002 Approval – Zone 1: Lots 1 & 2 DP 408240 and Lots 407 & 408 DP 1041934
- 28/08/2006 Approval – Zone 2: Lot 407 DP 1041934
- 24/12/2004 Approval – Zone 3: Lot 407 DP 1041934
- 25/11/2013 Approval – Zone 4: Lots 11, 12 & 13 DP 601306; Lot 408 DP 1041934 and Lots 1 & 2 DP 408240

As can be seen in Figure 4, the site has been divided into extraction zones. The previous reporting period (1st April 2016 – 31st March 2017) related to the extraction of sand from the Northern Extension Lots 11 – 13 and has continued throughout the current AEMR reporting period.

In terms of the mining process, topsoil is stripped before sand is extracted for processing at the nearby Salt Ash processing plant. Sand is extracted in a rolling south to north sequence where possible.

As Sibelco does not currently have access to the southern Hunter Water area, extraction occurred in a rolling east to west sequence during the reporting period. Pre-clearance surveys for flora, fauna and the presence of culturally significant sites and ecologically sensitive areas are undertaken prior to the clearing of vegetation.

Operations at the Tanilba Northern Dune are performed only during daylight hours from 7:00am to 6:00pm (light permitting) Monday to Friday.

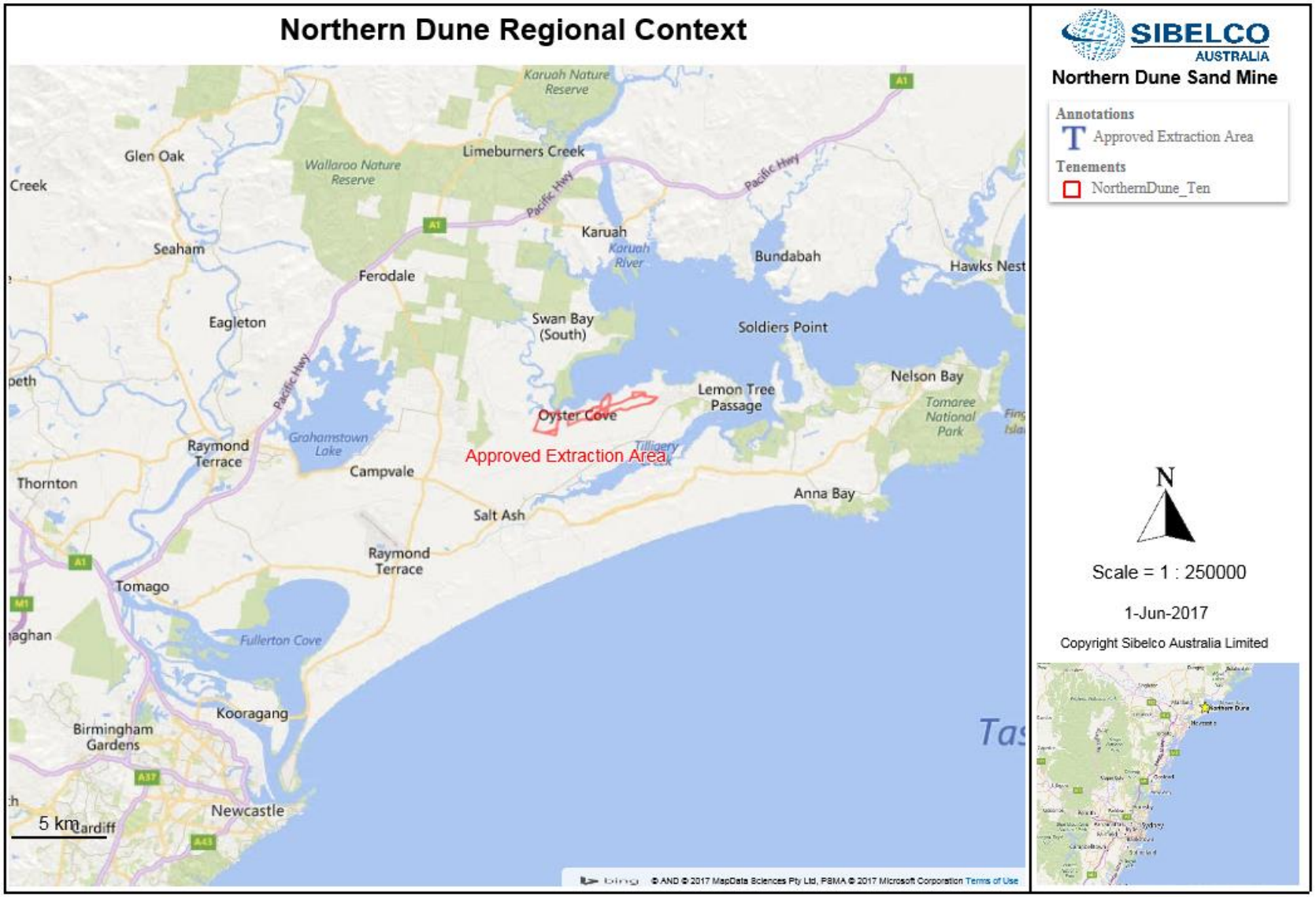

Figure 1: Northern Dune Regional Context Map

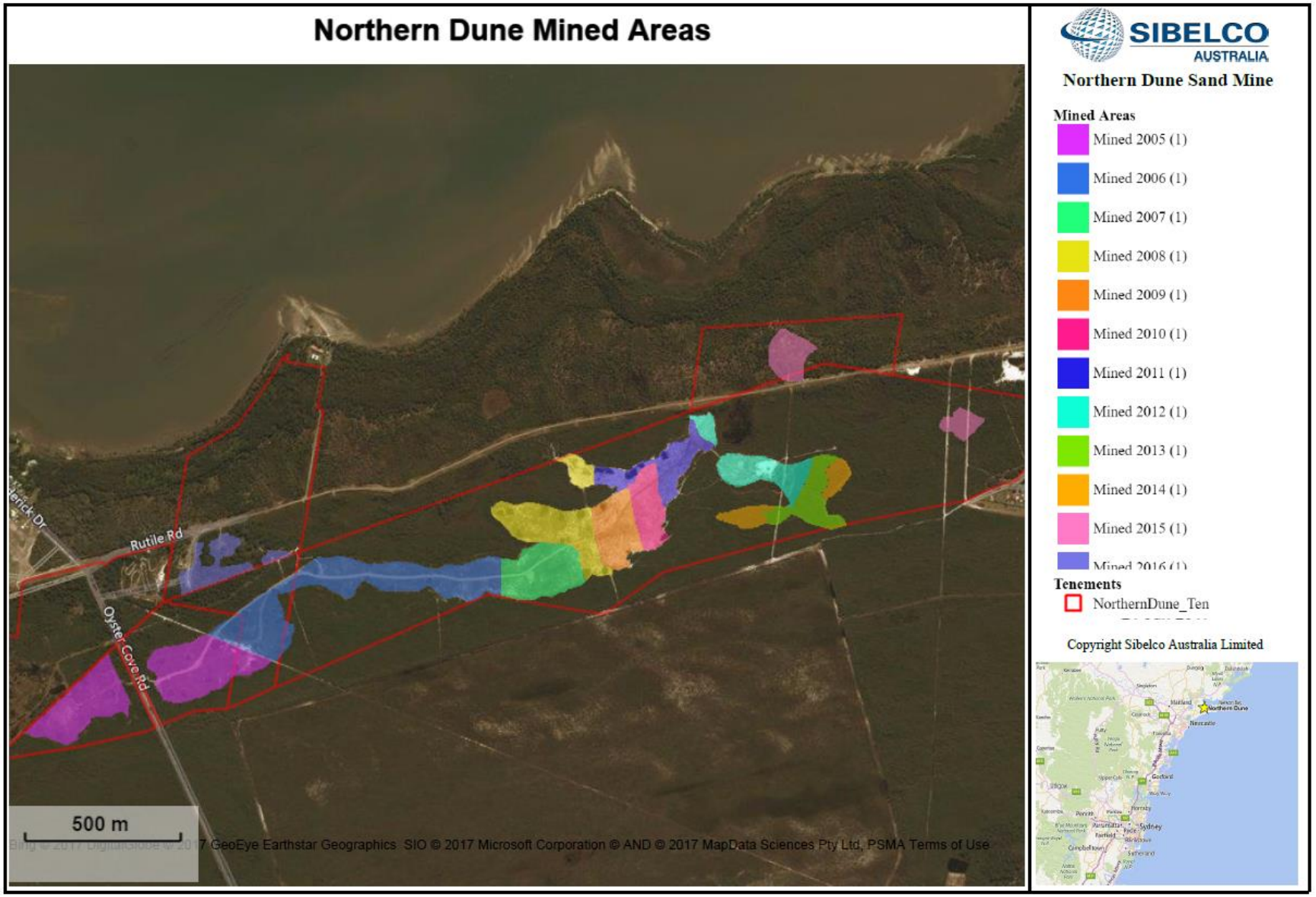

Figure 2: Northern Dune Mined Areas Since 2005

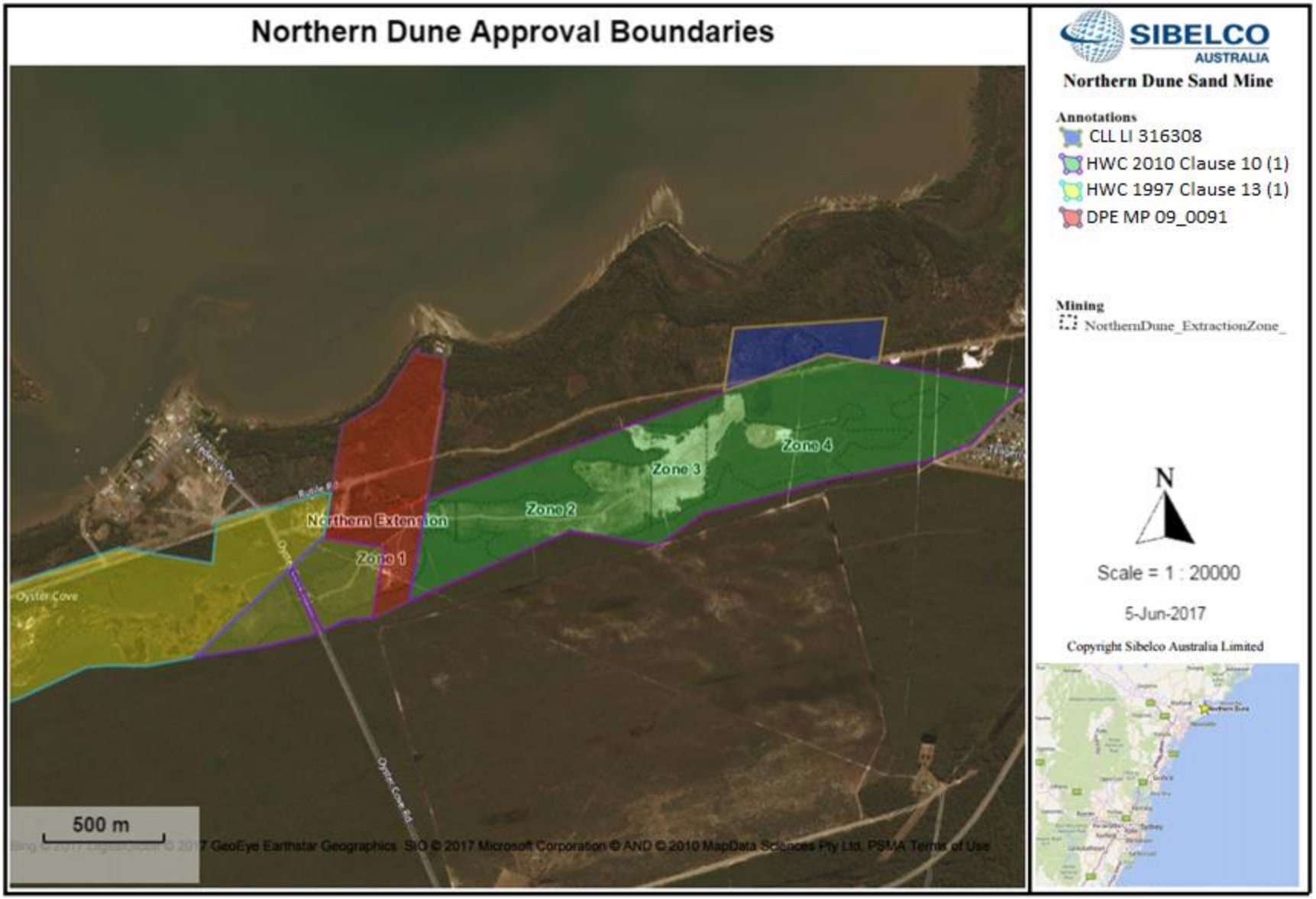

Figure 3: Northern Dune Approval Boundaries

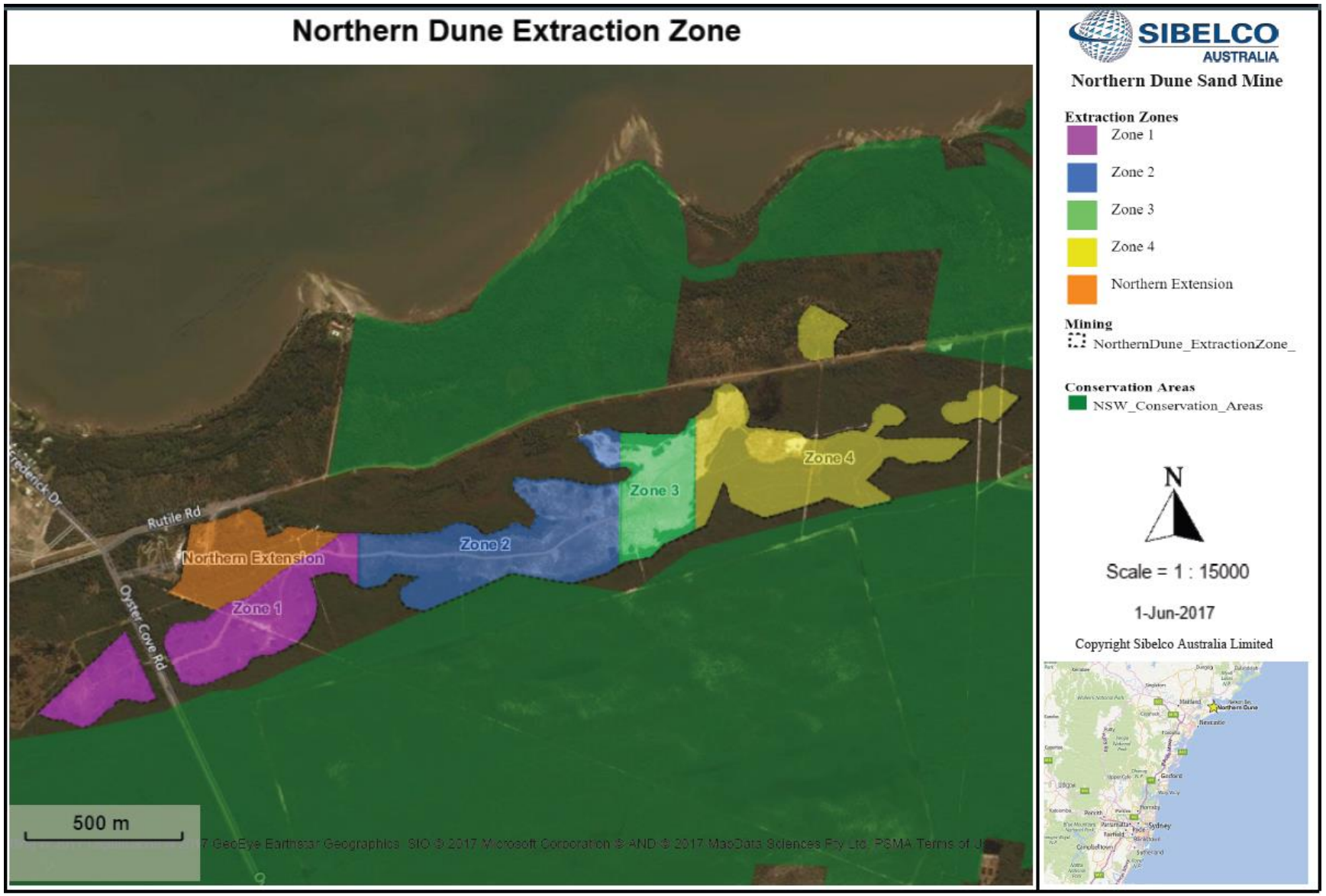

Figure 4: General Site Arrangement

1.3 Mine Contacts

Table 1 displays the current contact details for responsible personnel at Tanilba Northern Dune. Operations are coordinated from the Sibelco Salt Ash processing plant in close locality.

Table 1: Key Mining Contacts

Position	Name	Contact Details	
		Mobile	Office
Regional Manager	Prem Chand	0438 774 457	(02) 9458 2929
Operations Manager	Andrew Martin	0437 146 566	(02) 4982 6399
SE Coordinator	Nicholas Canu	0429 555 058	(02) 67611214
Senior Environmental Advisor	Paul Timmins	0437 130 854	(02) 9458 2930
Senior Hydrogeologist	Ian Oppy	0448 093 652	(03) 9738 8200

1.4 Consents, Lease, Approvals and Licences

Extractive operations in the Tanilba Northern Dune are undertaken in accordance with the various conditions outlined in the approval documents listed in Table 2 below.

Table 2: Current Approval Documents and Issuing Authorities

Approval Authority	Approval Document	Status
Hunter Water Corporation	Hunter Water (Special Areas) Regulations 1997 – Approval under Clause 13(1)	Current
Hunter Water Corporation	Hunter Water (Special Areas) Regulations 2010 – Approval under Clause 10(1)	Current
Department of Planning & Environment	MP 09_0091	Current
Environmental Protection Authority	EPL11633	Current
Crown Lands Licence	LI316308	Current
Crown Lands Licence	LI190885	Current
Port Stephens Council	DA 1139/94	Current

1.5 Actions from 2016 – 2017 AEMR

Following submission of the 2016 – 2017 AEMR, various actions and recommendations were received by regulatory authorities which have been addressed within this AEMR. Table 3 outlines action source and date, actions required and the section where this is addressed within this report.

Table 3: Actions from Previous AEMR

Action Source and Date	Action Required	Department	Section within AEMR
Letter – post AEMR submission (18/11/17)	All survey records taken since 1 April 2016 to present, to compare actual extraction depth to extraction depth limit (Schedule 3, Condition 10)	Department of Planning and Environment	Appendix P
	Advise on the need for a Long Term Management Strategic (Schedule 3, Condition 19)	Department of Planning and Environment	Appendix P
	Remove and appropriately dispose of all concrete waste piles from the site, as observed and noted during the site inspection.	Department of Planning and Environment	Appendix P
	Include in future AEMRs – Ensure all nest box monitoring is undertaken in accordance with the Biodiversity Management Plan and reported in future AEMRs	Department of Planning and Environment	Page 50, Section 5.3, plus Appendix N
	Include in future AEMRs – Weed Management and record keeping of weed surveys	Department of Planning and Environment	Page 51, Section 6.6 plus Appendix R
	Include in future AEMRs – A section to summarise the incidents and non-compliances	Department of Planning and Environment	Page 45, Section 5.1
	Include in future AEMRs – A Statement of Compliance which includes summary tables that highlight the compliance status with relevant approval conditions.	Department of Planning and Environment	Page 45, Section 5, Table 9

	Revise the Noise Management Plan to ensure a qualified and experienced person undertakes the relevant monitoring.	Department of Planning and Environment	Page 19, Section 2.1.4, Appendix S

2 ANNUAL REPORTING REQUIREMENTS

Section 2 addresses the annual reporting requirements for the approved extraction areas of the Tanilba Northern Dune. Section 2 and associated subsections report on the activities relevant to the following approval documentation:

- *Section 2.1 Project Approval MP 09_0091 as issued by the Department of Planning and Environment;* attached as Appendix A
- *Section 2.2 Hunter Water (Special Areas) Regulation 1997 approval under Clause 13 (1) as issued by the Department of Land and Water Conservation;* attached as Appendix B and;
- *Section 2.3 Hunter Water Regulation 2010 approval under Clause 10(1) as issued by the Department of Land and Water Conservation*, attached as Appendix C

2.1 Project Approval MP 09_0091

On the 8th of March 2013, Project Application MP 09_0091 was approved under Section 75J of the *Environmental Planning and Assessment Act 1979* for Sibelco Australia to conduct mining activities on Lots 11, 12 and 13 on DP601306; Lot 408 on DP1041934; and Lots 1 and 2 on DP408240. Project Approval MP 09_0091 has been attached as Appendix A.

The AEMR review required by approval MP 09_0091 is detailed in Schedule 5, Section 3 whereby it is stated:

"Within 12 months of the commencement of quarrying operations, and annually thereafter, the Proponent shall review the environmental performance of the project to the satisfaction of the Director-General. This review must:

(a) describe the works (including rehabilitation) that were carried out in the previous year, and the works that are proposed to be carried out over current year;

(b) include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against:

- *the relevant statutory requirements, limits or performance measures/criteria;*
- *the monitoring results of previous years; and*
- *the relevant predictions in the EA;*

(c) identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;

(d) identify any trends in the monitoring data over the life of the project;

(e) identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies; and

(f) *describe what measures will be implemented over the next year to improve the environmental performance of the project."*

The following subsections address specific MP 09_0091 reporting requirements in chronological order.

2.1.1 Schedule 2: Clause 6 – Total Extraction

"The Proponent shall not transport more than 150,000 tonnes of extractive materials from the site in any calendar year."

Stock reports between the 1st of April 2017 and 31st March 2018 record a total of 85 327 tonnes extracted and transported from the Northern Dune operations to the nearby Salt Ash processing facility.

2.1.2 Schedule 2: Clause 7 – Land Clearing

"The Proponent shall ensure that no more than three hectares of the site would be exposed (ie cleared but not re-vegetated) at any one time."

During the reporting period Sibelco undertook two major vegetation clearing events, under the supervision of environmental consultants Kleinfelder Australia. Clearing events took place on the 12th September 2017 and the 9th and 10th of January 2018 for a total 1.53ha of area. Reports provided by Kleinfelder on these events are located in Appendices D and E.

Sibelco has implemented a regime of continuous and progressive rehabilitation that follows the direction of extraction, allowing for previously mined areas to become revegetated. As new areas are cleared Sibelco follows the Biodiversity Management Plan and conducts pre-clearance surveys with the presence of a trained ecologist and fauna spotter / catcher.

The pre-clearance surveys help to identify hollow bearing trees, which are left for a minimum of two nights to encourage self-relocation. If any fauna is disturbed during the clearing activities, a fauna spotter / catcher is present on site to aid in relocation.

Progression of rehab is documented in the JP Environmental rehab monitoring report with images taken at regular intervals (Appendix K).

Following into the next reporting period, progressive rehabilitation will continue utilising the current management practices in place. Kleinfelder will be engaged to perform a site assessment during the next reporting period to start mapping and reporting on the progress of rehabilitation in Northern Extension Lots 11 – 13

2.1.3 Schedule 3: Clause 1 (b) – Boundary Marking

"Ensure that these boundaries are clearly marked at all times in a permanent manner that allows operating staff and inspecting officers to clearly identify those limits."

The boundaries of Northern Extension Lots 11 – 13 have been clearly marked and recorded using a Garmin GPSMAP 64s.

Photographs of boundary markers have been attached as Plates 4 & 5 for reference.

Continuing into the next reporting period, boundary markers will be checked during monthly inspections to determine if they need replacing. Boundary markers will also be installed if any new areas are entered during the next reporting period.

Plate 1: General view west, Northern Extension Lots 11 – 13

Plate 2: General view north-east, Northern Extension Lots 11 – 13

2.1.4 Schedule 3: Clauses 2 and 5 – Noise Monitoring

"The Proponent shall ensure that the operational noise generated by the project does not exceed the noise impact assessment criteria in Table 1 at any residence on privately-owned land."

Table 1: Noise impact assessment criteria

Receiver	***$L_{Aeq\ (15\ min)}$ dB(A)***
R1, R2, R3 and all residences in Oyster Cove	37
All other receivers	35

As required by Schedule 3, Clause 5 a noise monitoring program has been established to meet the requirements of Schedule 3, Clause 5 (b) which states noise monitoring is to be undertaken at quarterly intervals at three receiver locations (identified in figure 7) by suitably trained individuals.

During the previous AEMR period, Sibelco self-identified a gap in the monitoring regime and quickly implemented corrective actions. Global Acoustics have been engaged to carry out noise monitoring at Northern Dune on behalf of Sibelco to ensure compliance with the recently approved Noise Management Plan.

An updated NMP management plan was submitted and approved. Also a response to the show cause notice has been submitted and is still under review by the Department (Appendix S).

No exceedances were reported for this AEMR period. Reports on monitoring undertaken are available in Appendix O.

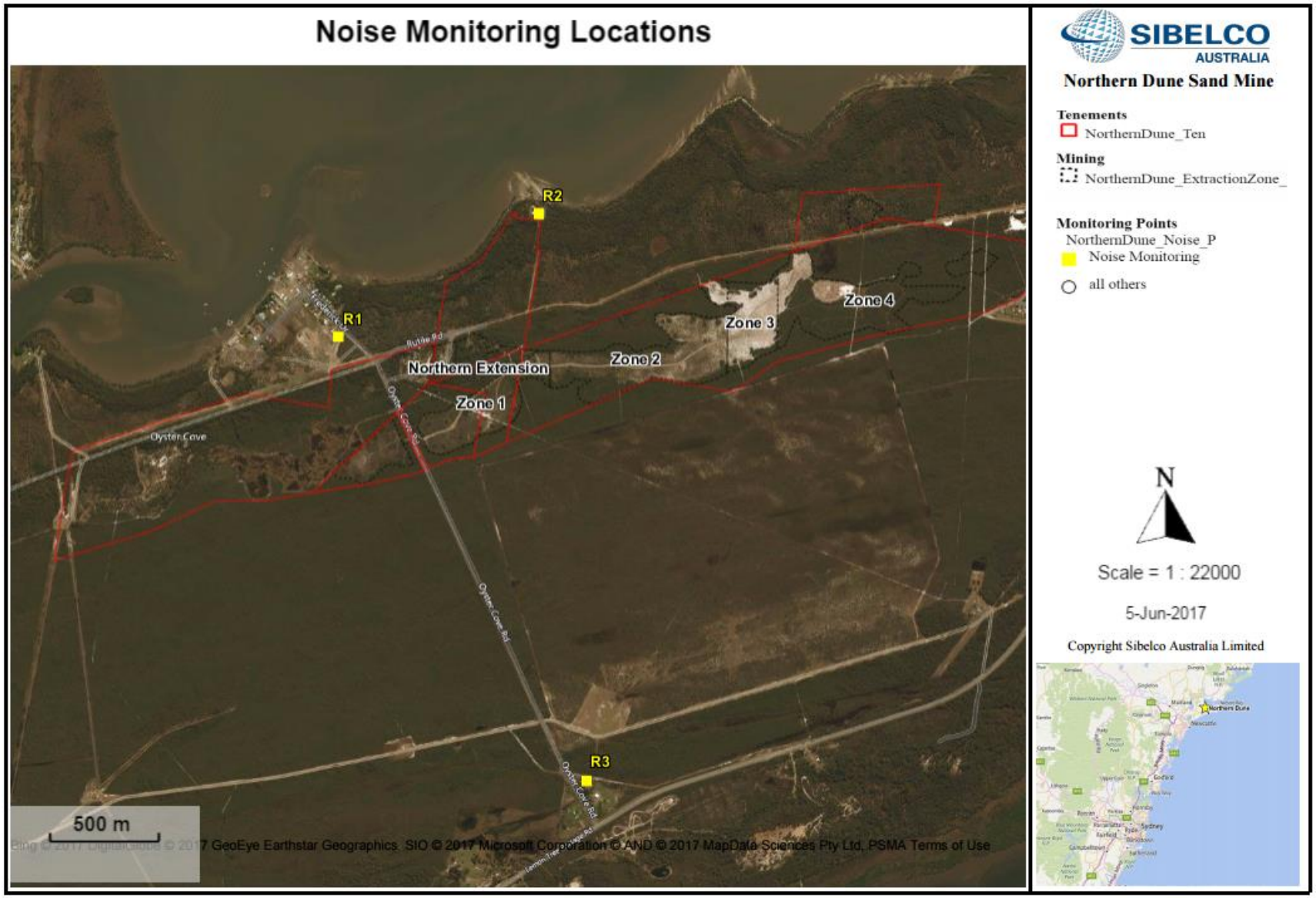

Figure 5: Noise Receiver Location

2.1.5 Schedule 3: Clause 6 – Dust Monitoring

"The Proponent shall ensure that all reasonable and feasible avoidance and mitigation measures are employed so that particulate matter emissions generated by the project do not exceed the criteria listed in Tables 2 to 4 at any privately-owned land."

Table 2: Long term criteria for particulate matter

Pollutant	Averaging Period	[d] Criterion
Total suspended particulate (TSP) matter	Annual	[a] 90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	[a] 30 µg/m^3

Table 3: Short term criterion for particulate matter

Pollutant	Averaging Period	[d] Criterion
Particulate matter < 10 µm (PM_{10})	24 hour	[a] 50 µg/m^3

Table 4: Long term criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Maximum total deposited dust level
[c] Deposited dust	Annual	[b] 2 g/m^2/month	[a] 4 g/m^2/month

Depositional dust monitoring is used to assess the potential for mining activities to cause nuisance dust in the community at sensitive receptor locations. All staff and contractors who perform work at Northern Dune follow the procedures outlined in the induction to minimise the potential impacts mining activities have on the surrounding environment and community. For example, site speed is restricted to 20 km/h and on days when there are high winds, operations are ceased.

Over the AEMR reporting period, depositional dust was monitored monthly at the locations indicated in Figure 8. Laboratory analysis was conducted by ALS Laboratory Services (NATA accredited) in accordance with *AS 3580.10.1 - 2003*.

The monitoring results for the AEMR reporting period can be seen in Table 5. The results have been compared against the criteria in Schedule 3: Clause 6, with a level of 4 g/m^2/month set as the trigger limit for insoluble solids (or Total Insoluble Matter as reported by ALS). When the 'Combustible Matter' portion of Total Insoluble Matter (TIM) is reduced from analysis results, TIM is an indicator of the mineral constituent of dust as indicative of soil or rock particles and is the parameter of interest when comparing results against the limit indicated above. Highlighted results within the table indicate where dust trigger limits were exceeded during the reporting period. Raw analytical data has been attached as Appendix F.

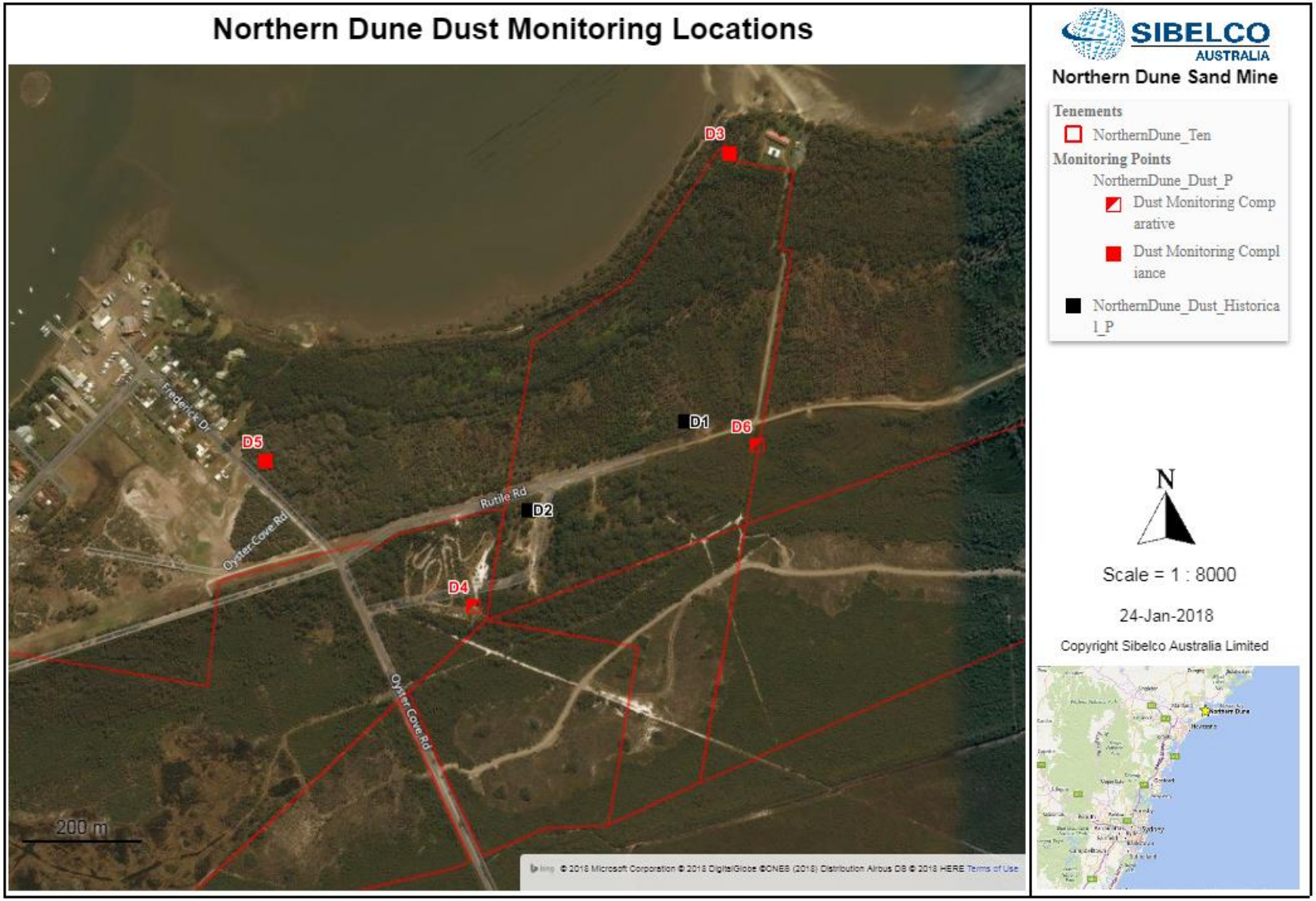

Figure 6: Dust Sampling Locations

Table 4: Deposition Dust Results

Sample Period	Sample ID	Ash Content ($g/m^2/mth$)	Combustible Matter ($g/m^2/mth$)	Soluble Matter ($g/m^2/mth$)	Total Insoluble Matter ($g/m^2/mth$)	Total Solids ($g/m^2/mth$)	Volume sampled (mL)
April 01/04/2017 – 11/05/2017	D6 (TB 1 Comparison)	2.2	0.1	0.4	2.3	2.7	x
	D4 (TB 2 Comparison)	0.6	0.8	2.1	1.4	3.5	x
May 11/05/2017 – 31/5/2017	D6 (TB 1 Comparison)	31.2	0.4	0.4	**31.6**	32	x
	D4 (TB 2 Comparison)	0.8	0.2	0.1	1	1.1	x
June 31/05/2017 – 04/07/2017	D6 (TB 1 Comparison)	33.4	0.4	1.1	**33.8**	34.9	x
	D4 (TB 2 Comparison)	0.7	0.4	0.5	1.1	1.6	x
July 04/07/2017 – 01/08/2017	D6 (TB 1 Comparison)	1.3	0.1	1.5	1.4	2.9	x
	D4 (TB 2 Comparison)	0.2	<0.1	0.2	0.2	0.4	x
August 01/08/2017 – 29/08/2017	D6 (TB 1 Comparison)	1.4	0.7	1.5	2.1	3.6	821
	D4 (TB 2 Comparison)	5.1	0.6	0.5	**5.7**	6.2	612
September 29/08/2017 – 03/10/2017	D6 (TB 1 Comparison)	1.1	0.4	0.9	1.5	2.4	135
	D4 (TB 2 Comparison)	5.8	0.4	1.3	**6.2**	7.5	178
	D5 (TB 3 Compliance)	0.8	0.6	0.9	1.4	2.3	348
October 03/10/2017 – 31/10/2017	D6 (TB 1 Comparison)	0.8	0.1	<0.1	0.9	0.9	876
	D4 (TB 2 Comparison)	16.2	0.8	0.2	**17**	17.2	880
	D5 (TB 3 Compliance)	0.7	<0.1	3	0.7	3.7	693
November 31/10/2017 – 30/11/2017	D6 (TB 1 Comparison)	0.7	0.3	1.3	1	2.3	1240
	D4 (TB 2 Comparison)	1.3	0.2	0.4	1.5	1.9	950
	D5 (TB 3 Compliance)	0.4	0.2	1.5	0.6	2.1	1280
December 30/11/2017 – 02/01/2018	D6 (TB 1 Comparison)	0.8	0.2	0.8	1	1.8	603
	D4 (TB 2 Comparison)	1.3	0.4	2	1.7	3.7	398
	D5 (TB 3 Compliance)	0.7	0.5	1.3	1.2	2.5	692
January 02/01/2018 – 05/02/2018	D6 (TB 1 Comparison)	1.6	0.2	1.3	1.8	3.1	487
	D4 (TB 2 Comparison)	2.2	0.5	0.8	2.7	3.5	219
	D5 (TB 3 Compliance)	0.6	0.1	0.8	0.7	1.5	475
February 05/02/2018 – 05/03/2018	D6 (TB 1 Comparison)	0.6	0.1	2.7	0.7	3.4	2040
	D4 (TB 2 Comparison)	2.1	0.3	1.5	2.4	3.9	1380
	D5 (TB 3 Compliance)	0.5	0.6	75.4	1.1	76.5	2020

Sample Period	Sample ID	Ash Content ($g/m^2/mth$)	Combustible Matter ($g/m^2/mth$)	Soluble Matter ($g/m^2/mth$)	Total Insoluble Matter ($g/m^2/mth$)	Total Solids ($g/m^2/mth$)	Volume sampled (mL)
March 05/03/2018 – 04/04/2018	D6 (TB 1 Comparison)	0.3	0.1	2.5	0.3	2.8	2020
	D4 (TB 2 Comparison)	0.3	0.1	0.6	0.3	0.9	300
	D5 (TB 3 Compliance)	0.4	0.1	2.9	0.4	3.3	2020
	D3 (TB 4 Compliance)	0.9	0.1	0.3	0.9	1.2	2010
Key				**Exceedance**			

Table 5 results indicate that there were no instances where TIM exceeded the nominal trigger limit of 4 g/m^2/month. There were 5 instances at the comparison points where the trigger level was exceeded, however as noted in the recently updated DMP, these are for comparison only and do not constitute the final compliance results.

During the previous AEMR period, it was discussed with DPE that Sibelco will seek an amendment for the relocation of monitoring points TB 1 and TB 2 which Sibelco suspect are not representative of receiving mining operation dust, due to location and suspected tampering from recreational users frequenting the area (dirt bikes, 4WD, cars). Whilst Sibelco prepared this amendment, routine dust monitoring continued in line with licence monitoring requirements and an additional location 'TB 3' will be set up in a representative area near the extractive area boundary, to better ascertain potential dust contributions from mining activities.

The updated DMP addressing the issues above, and with the new monitoring locations has been submitted and actioned. (See appendix Q)

2.1.6 Schedule 3: Clause 10 – Depth Marking

"The Proponent shall not extract sand or other extractive materials or carry out any work in the extraction area below a level of 0.7 m above the predicted maximum groundwater elevation (see condition 14 of schedule 3), other than the construction of any bores approved by NOW."

During the AEMR period, depth markers were installed throughout the extraction area by personnel who have been suitably trained in the use of a laser level. These visual aids have been installed using the Predicted Maximum Groundwater Elevation (PMGE) to reduce the potential for extraction below the level of 0.7m above the PMGE. Plate 6 shows photographic evidence of how depth markers are installed on site at Northern Dune.

In an effort to ensure that extraction levels are maintained and complied with, a GPS unit incorporating real time ground level control has been installed (after the 2017-2018 AEMR Period) on the dozer carrying out the extraction activity. This gives live data to the operator, ensuring the ground level required is available at all times. During the next AEMR period it is the intention not to use visual depth markers now that the GPS is commissioned.

Plate 3: Depth Marker within Northern Extension Lots 11 – 13

2.1.7 Schedule 3: Clause 11 – Final Landform

"The Proponent shall ensure that the final landform of the extraction area must be at least 1 metre above the predicted maximum groundwater elevation."

After extraction has been completed within an area, topsoiling is incorporated into the rehabilitation process to ensure the final landform is at least 1 metre above PMGE. A registered surveyor or suitably trained personnel to check final landforms and adjust, via the addition of more topsoil as required. Figure 10 provides a map showing final landform for the AEMR reporting period, verifying compliance with this clause.

This strategy will continue into the next reporting period, as areas reach extraction limits and are prepared for rehabilitation. Maps similar to Figure 10 will be produced on an intermittent basis as progressive rehabilitation occurs.

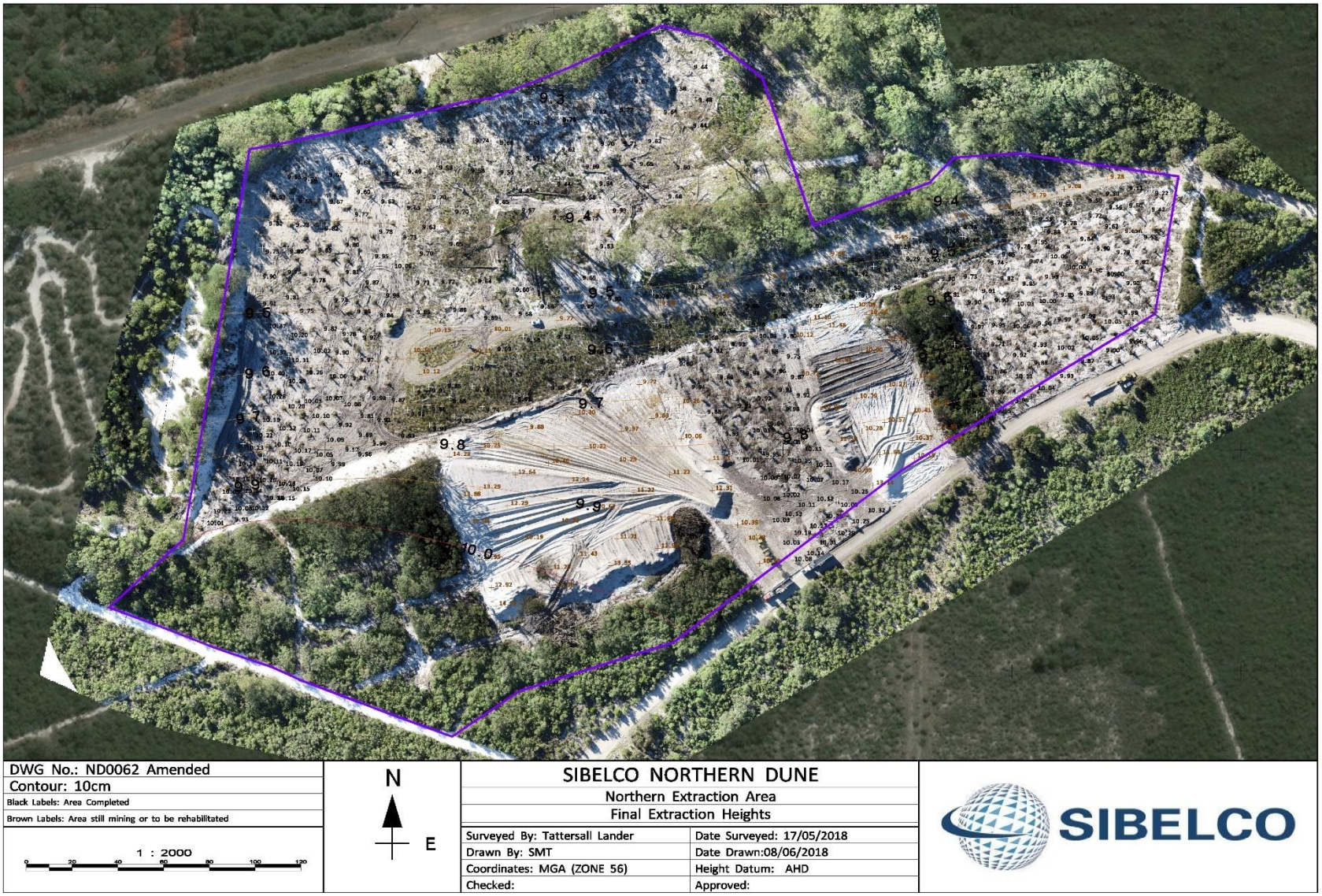

Figure 7: Final Landform Heights and Corresponding PGME

2.1.8 Schedule 3: Clause 16 – Biobanking

"By 31 December 2013, or otherwise agreed by the Director-General, the Proponent shall:

(a) enter into a Biobanking agreement in respect of the proposed offset areas (see Appendix 4) with the Minister for the Environment, in accordance with Part 7A of the Threatened Species Conservation Act 1995, to implement the Biodiversity Offset Strategy; or

(b) enter into an agreement with OEH to transfer the offset areas into the national parks estate, to the satisfaction of the Director-General."

Sibelco Australia has set aside land on Tanilba Bay Road as a biobanking offset for the extractive activities at Tanilba Northern Dune. A biobanking submission was made for Lot 21 (DP 579700), Lot 22 (DP 579700), Lot 23 (DP 579700), and Lot 24 (DP 579700), as indicated in Figure 11.

A biobanking assessment report was undertaken by 3rd party consultants Kleinfelder which was completed in February 2016. This assessment report was then approved after site inspection by Steve Lewer from the Office of Environment and Heritage (OEH) on 07/02/2017. A written approval was sent by Steve Lewer to the Sydney Biobanking department for approval.

At time of submission, a final agreement has been received and is currently under review with the Sibelco Legal Team.

It is anticipated once approval has been received from OEH that 1-year management actions will be attached to the approval, outlining works to be undertaken within the offset area over the next year. Over the next reporting period Sibelco will implement a regime to manage these actions and complete them within this time period as required by the approval.

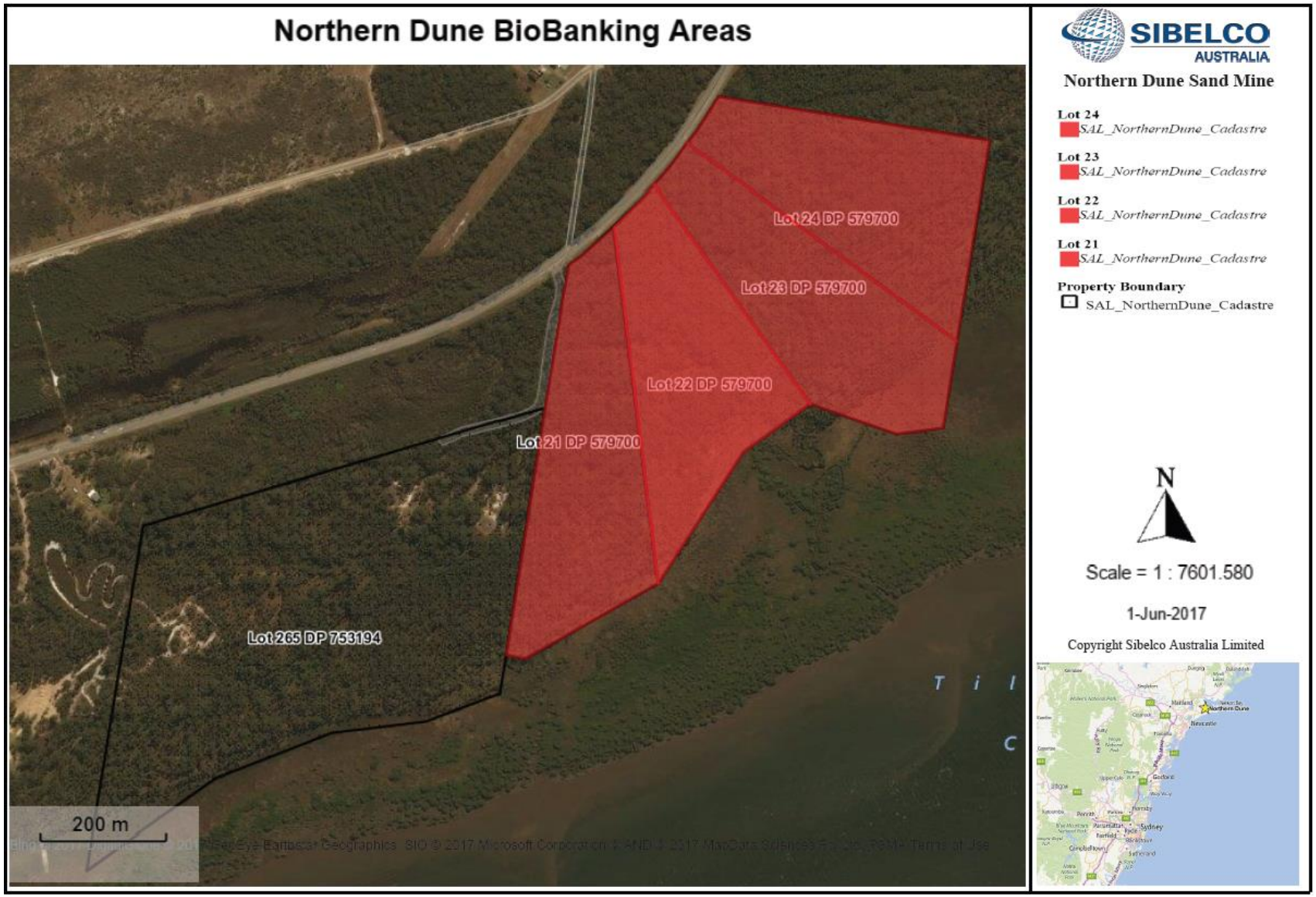

Figure 8: Northern Dune Biodiversity Offset Areas

2.1.9 Schedule 3: Clause 22 – Aboriginal Cultural Heritage

"The Proponent shall prepare and implement an Aboriginal Cultural Heritage Management Plan to the satisfaction of the Director-General. This plan must:

(a) be prepared in consultation with all relevant local Aboriginal communities;

(b) be submitted to the Director-General for approval prior to commencing quarrying operations;

and

(c) include:

· measures for the protection and management of site 38-4-0318 within Lot 13 DP601306;

· a program to complete prospective pre-clearance surveys of the extraction area in consultation with Aboriginal stakeholders;

· measures for ongoing consultation with local Aboriginal communities and the involvement of these communities in pre-clearance surveys and the ongoing management of any Aboriginal cultural heritage values identified within the site;

· an Aboriginal cultural education program for the induction of personnel and contractors involved in quarrying operations; and

· a description of the measures that would be implemented if any new Aboriginal objects or skeletal remains are discovered during the project."

Sibelco Australia has prepared an Aboriginal Cultural Heritage Management Plan in consultation with the three Registered Aboriginal Parties (RAPs) within the local area. The three RAPs are:

- Worimi Local Aboriginal Land Council
- Mur-Roo-Ma Incorporated, and;
- Nur-Run-Gee Pty Ltd

The Aboriginal Cultural Heritage Management Plan has been attached as Appendix G and contains plans of actions for unexpected finds such as new Aboriginal objects or skeletal remains during extraction. Appendix G also includes an ongoing plan to manage Aboriginal Cultural Heritage, with monthly surveys of spoil, as well as RAPs attending topsoil clearing and spreading activities.

All three RAPs were invited to site to participate for 2 preclearance surveys of the western end of Northern Extension Lots 11 – 13. The first survey was conducted in September 17 and the second in January 18. The regular monthly inspections were also conducted in line with these surveys.

During the preclearance survey, the three site officers surveyed the area in the various stages of vegetation clearing by walking in transects. Artefacts discovered during these processes have been stored at the Worimi LALC offices.

The finding of artefacts led to the recommendation that further inspections are carried out on a regular basis and in line with clearing activities. This recommendation was acted upon with topsoil clearing being included in monthly inspections as part of the Aboriginal Cultural Heritage Management Plan.

2.1.10 Schedule 3: Clause 34 (b) – Production Data

"The Proponent shall:

(a) provide annual quarry production data to DRE using the standard form for that purpose; and

(b) include a copy of this data in the Annual Review (see condition 3 of Schedule 5)."

Production data for Northern Dune in the reporting period report a total of 85,327 tonnes extracted from Northern Dune.

2.2 Hunter Water (Special Areas) Regulation 1997 approval under Clause 13(1)

On the 18th July 2002, Unimin Australia Limited (now trading as Sibelco Australia) was granted approval under Hunter Water (Special Areas) Regulations 1997 Clause 13(1) to carry out extractive operations in the Tomago Sand Beds Catchment Area. A copy of the Approval has been attached as Appendix B.

During this AEMR reporting period mining activities did not take place on the Lots exclusive to this approval.

The Special Areas Approval requires that an Annual Environmental Management Report (AEMR) be submitted on the anniversary of the Date of Issue for the term of the approval. The licence (Part 3, Clause 5, Clause 4 (a)) stipulates the requirements of the report. Specifically,

*"The Approval Holder must submit a report to the Director-General on each anniversary of the Date of Issue for the term of this Approval (**Environmental Management Report**), addressing:*

(i) the performance of and compliance with the provisions of the Groundwater Management Plan by the Approval Holder;

(ii) the performance of and compliance with the provisions of the Rehabilitation Plans by the Approval Holder;

(iii) the performance of and compliance with the provisions of any other requirements of this Approval by the Approval Holder;

(iv) any instances in which the Approval Holder has not satisfied the requirements of the Environmental Management Plan or this Approval, indicating any reason for that non-compliance and any action that is proposed to be introduced, or has already been implemented, to prevent or remedy the non-compliance;

(v) identification of trends in monitoring data from the Groundwater Management Plan and Rehabilitation Plans over the life of the Extractive Operations; and

(vi) environmental management targets and strategies for the subsequent year."

Addressing the approval in chronological order, this section will provide data and report on the various environmental monitoring requirements outlined in the Hunter Water (Special Areas) Regulation 1997.

2.2.1 Part 1: Clause 1, Section 1 (b) – Boundary Marking

"The Approval Holder may not undertake Extractive Operations outside of the boundary of the Operational Area as it exists from time to time, excepting that the Approval Holder may utilise any road outside the Operational Area for the purposes of access to the Operational Area and for associated purposes, including without limitation for the purpose of haulage of extracted sand away from the Operational Area, and the performance of any obligation under the Environmental Management Plan."

Please refer to Section 2.1.3 above for reference to boundary markers.

2.2.2 Part 2: Clause 3, Section 1 – Depth Marking

"The conduct of the Extractive Operations including the removal of vegetation and displacement of topsoil must not at any point:

*(a) remove any material from beneath 0.7 metres above the level depicted by the Applicable Maximum Predicted Groundwater Level Plan (**Extraction Buffer**) for that point; or*

(b) extend beyond the Operational Area. "

Please refer to Section 2.1.6 above for reference to depth markers.

2.2.3 Part 3: Clause 5, Section 4 (b) – Annual Inspection

"The Approval Holder must arrange an annual inspection of the Extraction Area to be attended by HWC and the Department."

A review of the previous AEMR was held at the Salt Ash office on the 25th of September 2017, as required under Clause 4 (b) of Part 3 of the Hunter Water (Special Areas) Regulations 1997.

An inspection of the current extraction area within Northern Extension Lots 11 – 13 also took place. (Meeting Minutes Available Appendix T)

The meeting was attended by individuals shown in Table 7.

Table 5: Attendees to Northern Dune AEMR Inspection

Attendee	Representing	Presence
Neil Stewart	Sibelco	Entire Meeting
James Epstein	Sibelco	Entire Meeting
John Simpson	Hunter Water	Entire Meeting
Dan Pederson	Kleinfelder	Entire Meeting
John Pola	JP Environmental	Entire Meeting
Ann Hagerthy	DPE	Entire Meeting
Leah Cook	DPE	Entire Meeting

2.3 Hunter Water Regulation 2010 approval under Clause 10 (1)

On the 25th of November 2013, a variation to the Special Areas approval was granted to Sibelco Australia under clause 10 (1) of the *Hunter Water Regulation 2010* (BN 13/5769). The approval was granted under the Hunter Water (Special Areas) Regulation 1997, which remains in force. Approval BN 13/5769 has been attached as Appendix C.

Addressing the approval in chronological order, this section will provide data and report on the various environmental monitoring requirements outlined in the approval.

2.3.1 Part 2: Clause 3, Section 1 – Laser Level Monitoring

"During Extractive Operations, the Approval Holder must monitor, to the reasonable satisfaction of the Director General, the height of the land from which sand is being extracted, including by taking regular measurements using a laser level in accordance with industry standard procedure by a person, whether a surveyor, geologist or other person, trained in surveying techniques."

Please refer to Sections 2.1.6 and 2.1.7 in reference to laser level monitoring at Northern Dune during the reporting period.

2.3.2 Part 3: Clause 9, Section 6 – Annual Inspection

"Within 3 months of the date on which the Annual Review is submitted to HWC and the Office of Water, the Approval Holder must arrange an annual inspection of the Extraction Area to be attended by HWC and the Office of Water."

Please refer to Section 2.2.3 in reference to the annual inspection held at Northern Dune during the reporting period.

3 COMPLIANCE WITH GROUNDWATER MANAGEMENT PLAN

As required by Part 3: Clause 5, Section 4 (a) (i) of the Hunter Water (Special Areas) Regulation 1997, and Schedule 3, Clause 14 of Project Approval MP 09_0091, this section will address compliance with the approved Groundwater Management Plan.

During the reporting period, visual inspections were carried out throughout the operational and rehabilitated areas with no surface water or ponding being noted. An ongoing groundwater level compliance checklist against the GMP is provided in Table 7.

Table 6: Groundwater Level Compliance Checklist

Condition	Period			
	December 2016	March 2017	December 2017	March 2018
Groundwater level monitoring completed as per GMP	Yes	Yes	Yes	Yes
Survey of pit floor level completed as per EMP	Yes	Yes	Yes	Yes
Survey of post-mining rehabilitation level completed as per EMP	Yes	Yes	Yes	Yes
Groundwater level is lower than the applicable PMGE	Yes	Yes	Yes	Yes
Pit floor level not less than the applicable PMGE plus 0.7m	Yes	Yes	Yes	Yes
Post-mining rehabilitation surface not less than the applicable PGME plus 1.0m	Yes	Yes	Yes	Yes

3.1 Regulatory Requirements

Groundwater Management issues are managed by the regulatory approved Groundwater Management Plan (GMP). The GMP has been developed to maintain compliance with the conditions of consent and licensing requirements stipulated by the relevant regulatory authorities, during development and operation at Northern Dune. The GMP provides a formal framework for ongoing monitoring of groundwater at the site to manage the potential impact of sand extraction on groundwater level and quality.

3.2 Groundwater Monitoring Network

The monitoring network consists of 21 Sibelco installed piezometers and 3 government bores. Groundwater level data is routinely collected from 23 piezometers with reporting against the 22 piezometers used to create PMGE surfaces for the extraction zones. Groundwater quality is routinely collected from 10 piezometers with reporting against operational trigger levels in extraction areas. Locations of the piezometers can be seen in Figure 13.

3.3 Baseline Monitoring

Groundwater monitoring was initiated at Northern Dune in 2002, prior to the commencement of sand extraction in 2003. Baseline groundwater level and quality monitoring is undertaken within a planned zone prior to commencing sand extraction. Baseline groundwater level monitoring is

used to create a Predicted Maximum Groundwater Elevation (PMGE) which is then used for determining depth of extraction and final landform.

Baseline groundwater quality samples are collected to create trigger values for comparison against sample concentrations during extraction operations and post-extraction operations to assist in detecting any changes in groundwater level and quality at the site. Since a GMP is approved prior to the commencement of operations baseline monitoring is incomplete and trigger values determined from the incomplete monitoring are provisional until sand extraction commences.

Groundwater monitoring of rehabilitated Extraction Zones is continued until release has been secured from the relevant regulatory authorities. Groundwater monitoring data is collected and analysed by suitably trained personnel in accordance with Sibelco Groundwater Monitoring Guidelines.

The baselines samples for each piezometer were used to create trigger values which are then tested against at predetermined increments. The bore depths are measured monthly and the results recorded on the Sibelco website, with groundwater quality testing undertaken biannually and reported to the relevant regulators.

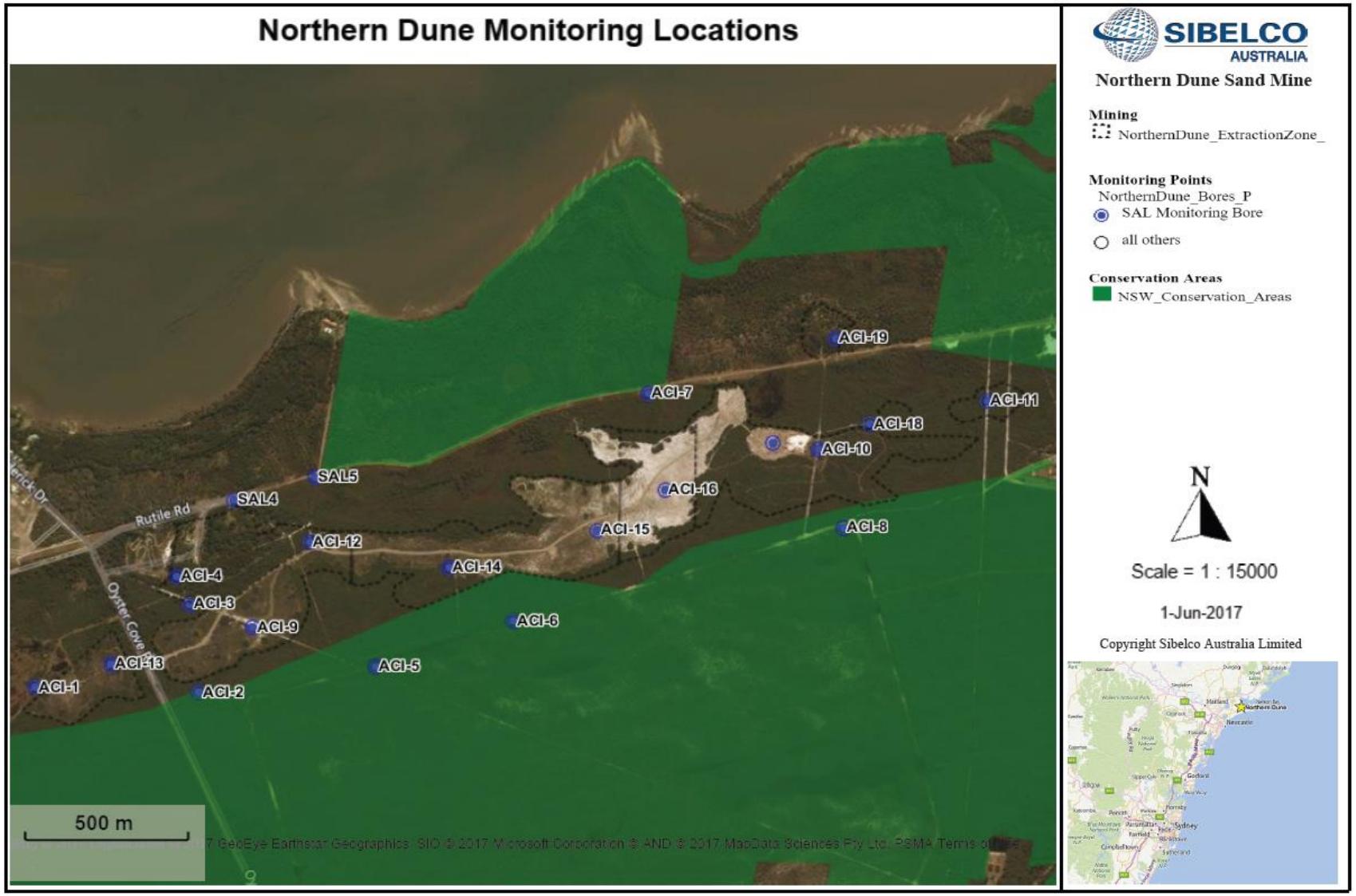

Figure 9: Piezometer Locations at Northern Dune

3.4 Groundwater Level Monitoring Methodology

As described in the GMP, operational groundwater level monitoring is undertaken to manage compliance with the PMGE. Groundwater levels in monitoring wells are routinely measured monthly, increasing in frequency to weekly for a period of four weeks following any period when rainfall at Williamtown equals or exceeds 100 millimetres over a seven-day rolling period, or when water levels are within 100 millimetres of the maximum predicted groundwater levels. Monitoring will continue for the duration of mining, and until the release of the obligation by the regulatory authorities.

Groundwater levels are measured by suitably trained Sibelco staff members using a depth gauge with electronic indicator. If analysis of groundwater level monitoring sample shows anomalous levels above the PMGE then groundwater in the effected monitoring well will be retested again as soon as possible and in any case within fourteen days to confirm the results. If retesting confirms the anomaly, the regulatory authorities will be notified within fourteen days of confirmation and an investigation will be initiated.

3.5 Groundwater Level Monitoring Assessment

Annual rain monitoring data recorded at Williamtown has been included in Figure 12 for reference. During the reporting period, the highest recorded rainfall was in June with 236.6mm being recorded. May 2017 was the lowest, with only 11.6mm falling throughout the month.

When rainfall levels exceeded more than 100mm in a seven-day period, bores were monitored weekly for a total of four weeks. This occurred twice during the reporting period.

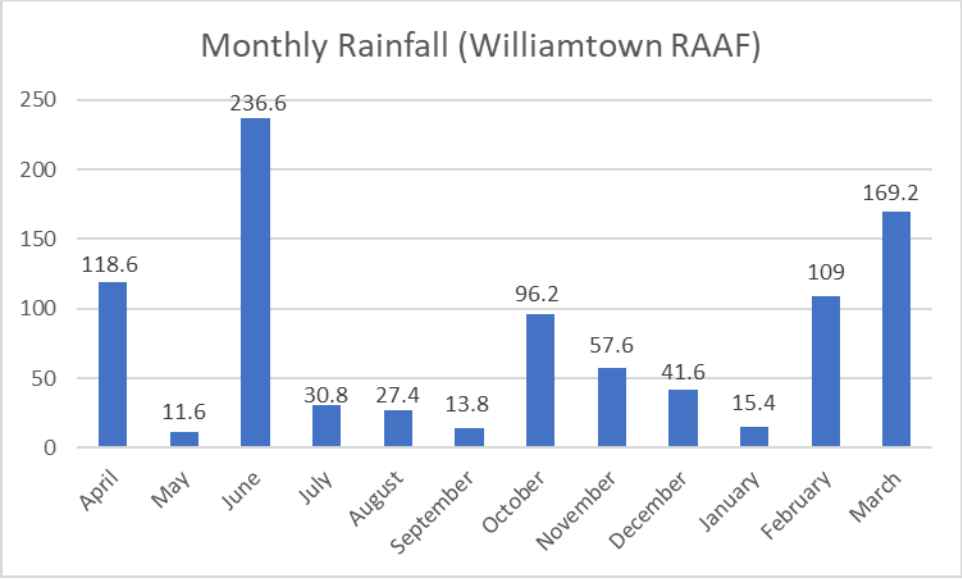

Figure 10: Monthly Rainfall Data Recorded at Williamtown RAAF

3.5.1 Groundwater Level Reporting

In accordance with the GMP, bore levels are measured once per month, or on a weekly basis during heavy rain periods where more than 100 mm of rain has fallen at the Williamtown RAAF weather station during a seven-day period.

In accordance with the GMP, the results of groundwater level monitoring are analysed to determine whether they are anomalous and whether further sampling is required. If further sampling confirms anomalous results, then notification to the regulators is required. From September 2013 – March 2017 ongoing exceedances of bores were not routinely reported to the regulators, because they were not anomalous.

Hunter Water has requested that all groundwater level exceedances of PMGE be reported as they occur and Sibelco is currently notifying the regulatory authorities of all exceedances, although this is not stipulated in the regulatory approved GMP.

During the reporting period there were no groundwater level exceedances at any of the monitoring points.

3.5.2 Groundwater Level Trends

During the previous reporting period, it was noted that groundwater levels fluctuate naturally in response to rainfall. During this reporting period the same is true; groundwater levels rise as there is increased monthly rainfall. This correlation is shown in the hydrographs provided in Appendices H & I.

3.6 Groundwater Quality Monitoring Methodology

As described in the GMP, operational groundwater quality monitoring is carried out biannually once mining commences in a zone, and will continue at a lower frequency for four years after mining ceases or as otherwise determined by the New South Wales Office of Water and Hunter Water Corporation.

Groundwater quality is sampled and tested by an external contracting company with results sent directly to Sibelco staff for analysis and reporting. If analysis of water quality monitoring sample shows anomalous concentrations of any analyte above trigger values, then groundwater in the effected monitoring well will be resampled and tested again as soon as possible and in any case within fourteen days to confirm the results. If resampling confirms the anomaly, Hunter Water Corp will be notified immediately, by telephone and in writing, and a Groundwater Assessment Plan will be prepared within 28 days of confirmation.

3.7 Groundwater Quality Monitoring Assessment

During the reporting period, groundwater quality assessments found exceedances in four piezometers, including initial exceedances. All initial exceedances were retested as per the GMP. Resampling found secondary exceedances in two of the bores.

3.7.1 Groundwater Quality Reporting

In accordance with the GMP, the results of groundwater quality monitoring are analysed to determine whether they are anomalous and whether further sampling is required. If further sampling confirms anomalous results, then notification of the regulators is required.

From September 2013 – March 2017 ongoing exceedances of bores were not routinely reported to the regulators, because they were not anomalous. Hunter Water has recently requested that all groundwater quality exceedances of trigger values be reported as they occur and Sibelco is currently notifying the regulatory authorities of all exceedances, although this is not stipulated in the regulatory approved GMP.

The results of groundwater quality monitoring are compiled in a summary report and submitted to the regulatory authorities on a six-monthly basis. Copies of these reports, including discussion on exceedances are located in Appendices H and I.

3.7.2 Groundwater Quality Trends

In previous years, there has been exceedances for groundwater quality at ACI-13 and ACI-16. As discussed in previous AEMR's this is an ongoing issue with these two bores at Northern Dune. After discussions with Hunter Water Corporation it has been that ongoing notifications about exceedances if the explanations of why they are exceeding is clearly explained within the report.

Hunter Water Corporation has made no indication that it believes trigger values should be re-evaluated, rather notification must be made within 14-days of the exceedance reading being obtained. Groundwater quality concentrations have naturally fluctuated in response to natural geochemical processes, as indicated in the data contained in Appendices H & I.

4 COMPLIANCE WITH REHABILITATION MANAGEMENT PLAN

As outlined in Part 3: Clause 5, Section 4 (a) (ii) of the Hunter Water (Special Areas) Regulation 1997, this section will address compliance with the approved Rehabilitation Management Plan.

4.1 Rehabilitation Management

The Rehabilitation Supervisor is JP Environmental Pty Ltd. Specific vegetation monitoring is undertaken by Kleinfelder, who specialise in flora monitoring. This information is given to JP Environmental Pty Ltd for their assessment of the site performance.

JP Environmental is engaged by Sibelco Australia to perform the role of independent Rehabilitation Supervisor under the Conditions of Consent for Tanilba Northern Dune. Clause 30 of the Conditions of Consent requires the rehabilitation Supervisor to conduct regular site visits "for the purpose of quality checking and continuous open communication and consultation with the Rehabilitation Officer and staff managing the Extraction Operations."

Approximately 1.8ha was rehabilitated during this reporting period, as determined by the rehabilitation supervisor which can be seen in the rehabilitation reports attached as Appendix K.

4.2 Rehabilitation Monitoring

Throughout the reporting period rehabilitation was monitored at regular intervals by JP Environmental and Kleinfelder.

4.2.1 JP Environmental Monitoring

Throughout the reporting period JP Environmental conducted five site visits, which are summarised in the reports attached as Appendix K. The inspections consist of walk through inspections to check if the existing rehabilitation is being maintained, and auditing performance against EMP 7 Vegetation Rehabilitation and EMP 9 Erosion and Sediment Control.

These EMPs have been approved as a part of the umbrella Environmental Management Plan for Northern Dune. Upon inspection, a checklist against the criteria in the EMPs is completed, which is included in Appendix K. The outcomes and observations of monitoring are detailed in the reports located in appendix K.

As a result of these observations various rehabilitation actions were suggested to be implemented by Sibelco to continue compliance with the EMP:

- Follow up inspections to manage regrowth.
- A weed eradication programme should be implemented over the remainder of the year with the goal of significantly reduce weed infestations.
- Check the height of the topsoil stockpile does not exceed 3 metres. Adjust the height if necessary.

Sibelco will continue this monitoring regime into the next reporting period to continue to flag these areas of improvement. During the next reporting period, action will be taken on the abovementioned actions from the rehabilitation supervisor to maintain ongoing compliance.

As can be seen in Appendix K, the EMP checklist list any non-compliances with the criteria that has been assessed on site.

4.2.2 Kleinfelder Monitoring

During the reporting period, Kleinfelder undertook an assessment of the rehabilitation in blocks M, N, O and P. These blocks fall within Zone 4, an area that was mined outside of this reporting period and progressively rehabilitated. Figure 15 below is included for reference. The monitoring report is attached as Appendix L.

The monitoring of these blocks in July 2017 and January 2018 found that rehabilitation in these blocks is progressing well and on track to achieve species diversity and cover targets.

Recommendations from the report determined that Blocks M, N, O and P do not need another planting regime and that continued monitoring will flag if diversity or cover begins to diminish.

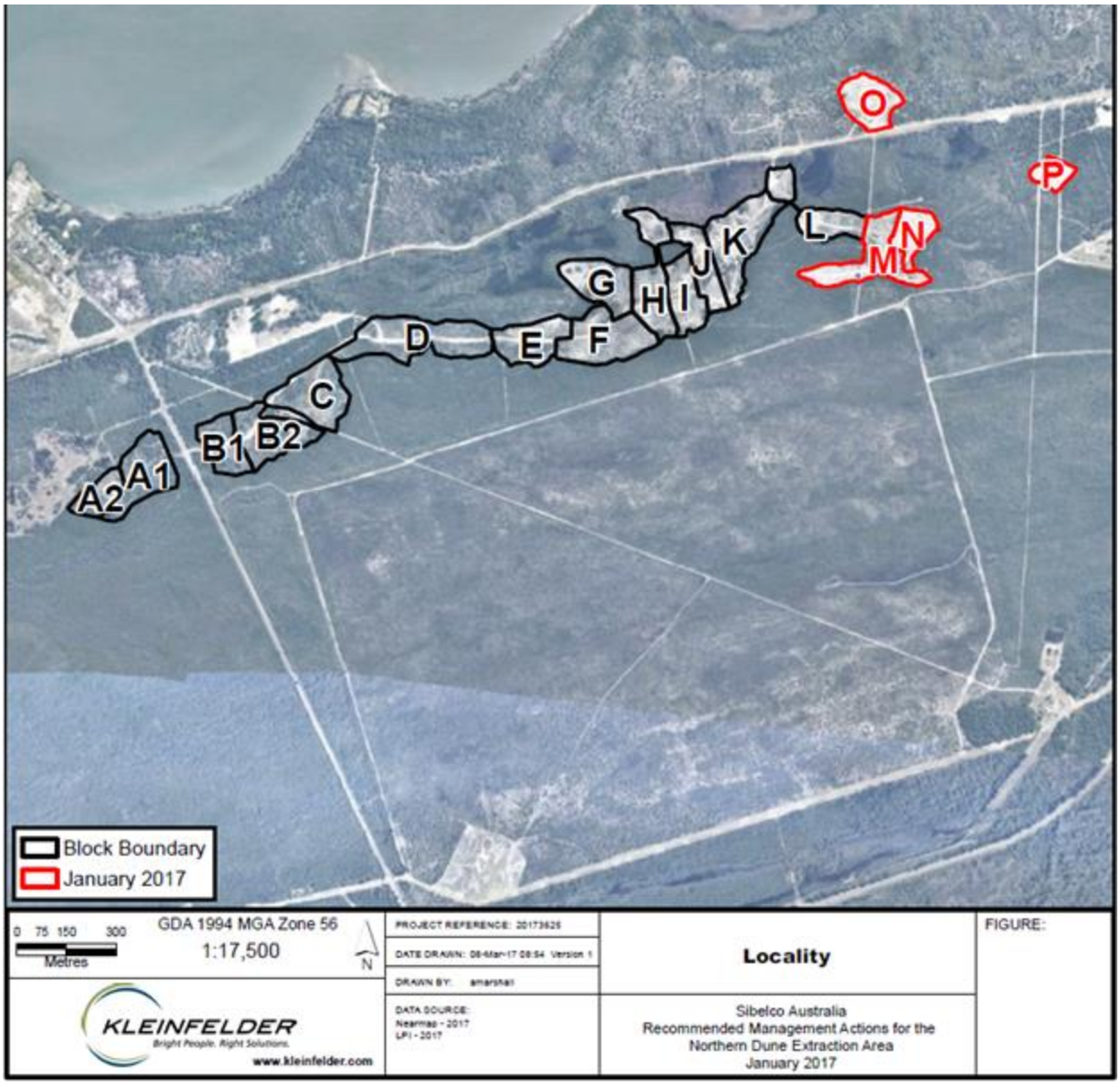

Figure 11: Map of Rehabilitation Blocks

Weed maintenance for each Block is also recommended, as well as weed control efforts being intensified both along the haul road where revegetation is still in its very early stages and in Block O particularly, where invasive grasses are becoming established. This may need to involve a combination of herbicide application and manual weed control measures to prevent collateral damage to native vegetation.

During the reporting period, weed control measures (herbicide spraying) was undertaken on several occasions throughout January (refer Appendix R). The invasive grasses continue to be an obstacle to the establishment of desirable natives from the seed bank and their continued presence risks their spread to other areas within the block. Given the density of midstorey and

canopy species, shading out will occur as the vegetation matures, but waiting for this to happen risks the further spread of these weeds and less than ideal revegetation effort.

Sibelco has implemented a regime of weed control which is ongoing, maintaining a continued commitment to ongoing and progressive rehabilitation.

4.3 Rehabilitation Trends

Information regarding trending has been derived from the annual rehabilitation report and the 8-year survey report prepared by Kleinfelder (attached as Appendices L & M).

5 COMPLIANCE WITH ENVIRONMENTAL MANAGEMENT PLAN AND LEGISLATIVE OBLIGATIONS

As outlined in Part 3: Clause 5, Section 2 of the Hunter Water (Special Areas) Regulation 1997, as well as Appendix 3 – Statement of Commitments from Development Approval MP 09_0091, this section will address compliance with the approved Environmental Management Plan.

Table 12 is a generated checklist from the statement of commitments from Appendix 3 of MP 09_0091. The checklist outlines where it is addressed throughout the report. Any sections that haven't been directly addressed as a part of other commitments have been addressed below as a part of Section 5.

Table 7: Compliance Obligations / Statement of Commitments

Issue	*Mitigation Measure / Commitment / Obligation*	*Where Addressed*	*Complied With?*
Environmental Management Plan	The currently approved EMP (2003) will be applied over all 9 EMPs and updated as necessary to meet the needs of the extension area. These include:	x	
	• EMP1 – Environmental Induction and Training	1.5	Y
	• EMP2 – Hydrocarbon Spill Procedure	6.13	Y
	• EMP3 – Operations Management Procedure	3, 6.13	Y
	• EMP4 – Extraction Depth and Area Monitoring	2.1.3 and 2.1.6	N
	• EMP5 – Groundwater	3	Y
	• EMP6 – Cultural Heritage	2.1.9	Y
	• EMP7 – Vegetation Rehabilitation	4	Y
	• EMP8 – Landform Rehabilitation	4	Y
	• EMP9 – Erosion and Sediment Control	5.1	Y
Groundwater Monitoring	The Groundwater Management Plan (GMP) in place for the existing operation will be updated to incorporate ongoing monitoring at the additional bores SAL4 and SAL5 in accordance with the existing approved monitoring regime.	3	Y

Issue	Mitigation Measure / Commitment / Obligation	Where Addressed	Complied With?
	Current environmental management commitments will be adopted for the extraction extension, including:	x	
	• Groundwater quality and level monitoring, and reporting as part of the approved groundwater management plan;	3.5 / 3.6	Y
	• Regular review of environmental performance through the AEMR process;	3	Y
	• Maintenance of a minimum 1.0 m vertical buffer between the PMGE and the final landform (extraction will occur to 0.7 m above PMGE, with final rehabilitated landform being 1.0 m above these elevations following placement of 0.3 m topsoil);	2.1.6	N
	• Staged rehabilitation of extraction areas;	4	Y
	• Avoiding storing machinery or hazardous materials onsite; and	6.13	Y
	• Avoiding servicing or refuelling equipment onsite.	6.13	Y
Noise Emissions	The currently approved EMP (2003) would continue to be applied, and updated as necessary to meet the needs of the proposed extension area.	2.1.4	Y
	All reasonable steps would be undertaken to reduce noise emissions during extraction and transport.	x	
	• Sequentially extracting from the south to the north, so that the topography will naturally help shield the sensitive receptors to the north against operational noise emissions;	1.2	Y
	• Ensuring all machines are in good working condition, with particular attention to exhaust silencers, engine covers and other noise reduction devices;	6.11	Y
	• All work and transport will be restricted to daylight hours, typically from 7:00am to 6:00pm Monday to Friday, but when light permits continuing to 7:00pm; and	1.2	Y
	• Site imposed speed limits up to 20 km/h to be enforced to minimise noise generation.	2.1.5	Y
Air Emissions	Air emissions related management measures are already in place and proposed to continue as part of the extension of operations to reduce the generation of particulate emissions.	2.1.5	Y
	A water tanker will be used on all unsealed roads on an as as-needs basis, dependant on weather conditions.	2.1.5	Y
	Sand extraction cells will be progressively rehabilitated throughout the life of the extraction. It is anticipated that no more than three hectares will be exposed at any one time.	2.1.2	Y
Surface and Groundwater Quality	Surface water management principles will be implemented to prevent contamination of surface (and therefore groundwater) quality. Management and monitoring actions stipulated in the existing Groundwater Management Plan (2011) for current operations will be	3	Y
	Additional documents will be produced for the extraction extension area to mitigate any impacts to the quality of the groundwater, the adjoining forested wetlands and, to aid in the rehabilitation of the extraction area post sand mining including:	x	
	• Surface Water Management Plan to prevent runoff, pollution and sedimentation from the extraction area entering into adjoining forested wetlands;	3	Y
	• Vegetation and Weed Management Plan for rehabilitation of the proposed sand extraction area; and	4	Y
	• Offset Strategy and associated Habitat Management Plan which will detail management actions to be undertaken on the remaining portions of Lots 11, 12 and 13 and on Lot 24. This plan will cover vegetation, weed, fire and storm water management, minimisation of edge effects, control of public access and management of habitat enhancement measures.	2.1.8	Y
Ecology	Hollow bearing trees 16,17,18 and 20 (refer to Figure 2.2, Northern Dune Submission Report) to be retained.	2.1.2	Y
	• Avoidance of the use of biocides and implementing erosion and sediment controls;	6.3	Y
	• Incorporating implementation of pre-clearing surveys, a fauna displacement mitigation protocol, Koala mitigation measures, nestbox installation and monitoring, and a monitoring plan for the Wallum Froglet as detailed in Annex M of the EA;	2.1.2	Y

Issue	Mitigation Measure / Commitment / Obligation	Where Addressed	Complied With?
	• Staged rehabilitation of the extraction area (to be supported by a Vegetation Rehabilitation Management Plan), to be conducted in the same fashion as successful rehabilitation of Sibelco's existing approved extraction areas directly to the south; and	4	Y
	• Implementation of an Offset Strategy as detailed in Section 11.6.4 if the EA.	2.1.8	Y
Vegetation Clearing	At least one week prior to any vegetation clearing, a survey of habitat trees will be conducted in the planned clearing area in accordance with the survey methodology outlined in Section 11.6.1 of the EA	2.1.2	Y
	Pre-clearing surveys will be conducted to check for the presence of any Koalas within the proposed extraction area.	2.1.2	Y
	Hollow-bearing trees will be left standing for two nights after the surrounding vegetation has been cleared to encourage any native fauna species utilising the habitat hollows to self-relocate. The actual felling of any habitat trees will be attended by a suitably experienced fauna ecologist in order to ensure the safety of any fauna found to be in the hollows. On all occasions, trees having potential habitat hollows should be 'soft felled' by an experienced machine operator in accordance with the procedure outlined in section 11.6.1 of the EA.	2.1.2	Y
Fauna Displacement Protocol	A fully qualified, experienced and licensed ecologist will supervise clearing and encourage movement of any displaced animals into adjoining vegetation.	2.1.2	Y
	Captured fauna and/or displaced fauna will be relocated to adjacent habitat by an ecologist. During tree removal or any other construction activity, Fauna Displacement protocols outlined in Section 11.6.2 of the EA will be followed in the case of an injured animal.	2.1.2	Y
Wallum Froglet Management Plan	A management plan for the Wallum Froglet (*Crinia tirwula*) will be developed in accordance with the management guidelines outlined under Section 6 of the National Recovery Plan for the Wallum Sedgefrog and Other Wallum- dependent Frog Species. In particular this will include specifications on:	x	
	• Minimising affects from soil disturbance;	5.1	Y
	• Ensuring sufficient retention of vegetation particularly around breeding sites; and	5.2	Y
	• Monitoring the habitat condition and frog numbers to ensure the threats to the species are properly managed. This should be undertaken with sufficient regularity and should preferably be carried out a year or more before development starts and continue for the duration of extraction operations, including rehabilitation works.	5.2	Y
Nestbox Installation and Monitoring Program	A nestbox installation and monitoring program will be implemented on a ratio of 2:1 to replace 38 hollows present in the 17 hollow bearing trees mapped within the proposed extraction area. Nestboxes should be erected prior to clearing commencing in order to provide alternative den and/or nest sites for any displaced fauna.	5.3	Y
	Nestboxes are to be erected within the Proposed Offset Areas on Lots 11, 12 and 13. Nest box designs should be selected to replace the natural hollow sizes removed (ie, 20 small, 16 medium and 2 large) and will target insectivorous bats, gliders and possums. Annual monitoring for a minimum 6-year period post installation is recommended to record uptake of the nestboxes and to attend to any maintenance issues. A brief letter confirming annual inspection of the nestboxes and documentation of results should be provided to OEH.	5.3	Y
Vegetation Management and Monitoring Plan	Weed Management and Vegetation Management and Monitoring Plans will be prepared for the rehabilitation area and proposed Offset Areas on Lots 11, 12, 13 and 24, which will include a thorough and intensive program to protect the adjoining forested wetland communities against weed invasion, and surface and underground run-off that may occur both during and after sand extraction activities. The management and monitoring plans will consider:	x	
	• The nature and control of sediment run-off during the extraction phase particularly as a result of an exceptional storm event;	5.1	Y
	• The volume, path and content of storm water discharging from the site during and after extraction;	5.1	Y
	• The handling of hydrocarbon spills on the site;	6.13	Y
	• Existing flow regime of surface and groundwater flow from the proposed extraction area into the forested wetlands; and	3	Y
	• Weed invasion	4.2.2	Y

Issue	Mitigation Measure / Commitment / Obligation	Where Addressed	Complied With?
Biodiversity Offset Strategy	A biodiversity offset strategy will be adopted as outlined in detail in Annex P of the EA. Biodiversity offsets are proposed on lands currently owned by Sibelco, comprising portions of Lots 11 to 13, DP601306 (approximately 18.35 ha) and all of Lot 24, DP579700 (approximately 9.44 ha) (the offset lands). A secure offset mechanism (through a Voluntary Conservation Agreement or other similar tool for management in perpetuity) will be placed over these offset lands, which will result in permanent protection and management of the land and result in numerous ecological benefits.	2.1.8	Y
Aboriginal Heritage	As ground visibility is limited within the extraction extension area, further archaeological work is required prior to commencement of extraction operations. The further assessment will be undertaken in accordance with any conditions of consent and will consist of a prospective clearing program that will be undertaken to improve ground visibility and allow the registered Aboriginal stakeholders to inspect the ground surface within the approved extraction area, to provide greater certainty of the presence or otherwise of Aboriginal archaeological sites. Sibelco will contact the three Aboriginal stakeholder groups at least three weeks prior to the proposed clearing and invite them to attend. Details of the methodology as agreed by the registered Aboriginal stakeholders is presented in Chapter 7 of Annex N of the EA, including procedures for undertaking the required site clearance, required actions should Aboriginal sites or artefacts be found during the prospective clearing program, and the requirements for updating the Cultural Heritage Management Plan, which will be undertaken prior to commencement of any extraction.	2.1.9	Y
Bushfire	• Provision of a separation distance (minimum of 10 m) between stockpiles of combustible material and remnant vegetation;	6.11	Y
	• Managing operations and the site to minimise likelihood of ignition sources through good 'housekeeping' (for example, all waste in bins);	6.11	Y
	• Emergency planning procedures in the event of a fire occurring on the site;	6.11	Y
	• Fitting of all earth moving machinery with spark arresting mufflers and haul trucks have serviceable exhaust systems to prevent accidental ignition of vegetation; and	6.11	Y
	• Equipping the operations to assist in the management of any fires on-site, including presence of fire extinguishers, water cart (as contracted), and the site front-end loader and bulldozer for any requisite firefighting purposes.	6.11	Y
Waste Management	• No burning of waste;	6.11	Y
	• Any noxious plant species will be removed from the site, bagged and disposed of at a licensed landfill;	4.2.2	Y
	• Any waste will be removed daily and recycled or disposed of directly at a licensed landfill; and	6.2	Y
	• The site will be maintained and kept free of rubbish and cleaned up at the end of each working day.	6.2	Y

5.1 Summary of Incidents and Non-Compliances

No Incidents were recorded during this AEMR period. Non-Compliances are summarised in Table 9.

5.2 Erosion and Sediment Control Management Plan

As required by the statement of commitments seen in Table 9, the following section addresses compliance with the approved erosion and sediment control plan.

The erosion and sediment control plan identifies Northern Dune as a low risk environment due to the soil classes that have been mapped in the area. Erosion or sedimentation of exposed or rehabilitated areas and sedimentation of drainage lines has been assessed as low risk.

During the reporting period, activities did not increase the risk of erosion or sedimentation across the site.

Topsoil stockpiles are to be located at least 5 m away from drainage lines and vegetation drip lines to reduce the risk of sedimentation. During the reporting period, all topsoil stockpiles were managed per this plan.

Monthly inspections are undertaken at Northern Dune. As a part of this the condition of roadside drainage, extraction faces, rehabilitation areas and stockpiles are assessed to manage any rectification works that need to be performed. If the monthly inspections determine any susceptible areas, silt fences will be installed per the erosion and sediment plan.

5.3 Wallum Froglet Management Plan

As required by the statement of commitments seen in Table 9, the following section addresses compliance with the Wallum Froglet Management Plan.

Large areas of Wallum Froglet (*Crinia tinnula*) habitat were identified during environmental assessment works completed as a part of the Biodiversity Management Plan. One area was identified in the north within Swamp Mahogany Paperbark – Swamp Forest around Big Swan Bay, and a second area within the Swamp Mahogany Paperbark – Swamp Forest (both remnant and regenerating) on either side of the rutile road.

To manage this and reduce the risk of impacting on the Wallum Froglet habitat buffers of approximately 50 m have been retained between the extraction area and these areas. A visual amenity buffer has also been retained.

As part of the Biodiversity Management Plan, targeted fauna monitoring was undertaken prior to the commencement of extraction across the offset areas to monitor the Wallum Froglet and identify breeding habitat, detect changes in recruitment success and assess the ongoing impacts of the quarry.

Any threats to the species that are identified will be correctly managed to minimise any adverse effects that may arise.

During the reporting period, no specific monitoring or management was undertaken besides the ongoing commitment to pre-clearance surveys whenever any vegetation is going to be cleared. Pre-clearance surveys involve the presence of a trained ecologist and spotter / catcher who is able to identify, capture and release any fauna found within the area marked for clearance. This is referred to in Section 2.1.2.

No Wallum Froglets were located during the reporting period.

Sibelco will continue to monitor for Wallum Froglets during the next reporting period and maintain the offset area per the Biodiversity Management Plan.

5.4 Nestbox Installation and Monitoring Program

As required by the statement of commitments seen in Table 9, the following section addresses compliance with the nestbox installation and monitoring program.

A nestbox installation program was implemented on 21st and 23rd December 2015 to offset the loss of 26 hollows in Northern Extension Lots 11 – 13. They were replaced at a 2:1 ratio resulting in the installation of 52 nestboxes in the northern offset within Coastal Sands Apple Blackbutt Forest and the northern section of the Swamp Mahogany – Paperbark Forest. Nest boxes were positioned within the Northern Offset Area in areas of vegetation that contained suitable food resources but lacked denning sites for arboreal fauna. As such, the central part of the offset area was the most appropriate site for installation. The installation of the nestboxes was supervised by suitable trained ecologists to ensure appropriate site selection.

During the reporting period, to conduct annual monitoring of the nestboxes, Sibelco has engaged environmental contractor Kleinfelder to visit site and prepare a report on the monitoring of the nest boxes. The monitoring will evaluate uptake and attend to any maintenance issues that occur during the year. Results will be provided to OEH, as well as in the AEMR, per the Biodiversity Management Plan. This report is located in Appendix N and monitoring shows the use of these nesting boxes to varying degrees.

6 OTHER REPORTING

The following sections cover criteria that is reportable per the January 2006 Annual Environmental Management Report guidelines and falls outside of reporting from compliance documentation and management plans.

6.1 Exploration

No exploration took place at Northern Dune during the reporting period.

Land clearing was only undertaken within the approved extraction zone, described in section 2.1.2.

6.2 Construction

No construction took place at Northern Dune during the reporting period.

No permanent infrastructure has been constructed on-site at Northern Dune, as per approvals. No bins or other waste management facilities are kept on site, with any waste produced removed at the end of each working day.

6.3 Erosion and Sediment

There were no issues with erosion or sediment at Northern Dune during the reporting period.

No biocides or chemicals are used at Northern Dune as a sediment or erosion control. Any works undertaken will follow the erosion and sediment control plan.

6.4 Threatened Flora

There were no issues with threatened flora at Northern Dune during the reporting period.

During clearances surveys a trained botanist was on-site to determine the presence of any threatened flora or hollow-bearing trees to manage their correct management if located.

6.5 Threatened Fauna

There were no issues with threatened fauna at Northern Dune during the reporting period.

During clearances surveys a trained spotter/catcher was on-site to determine the presence of any fauna and to relocate where necessary.

6.6 Weeds

There were no issues with weeds at Northern Dune during the reporting period.

The presence of weeds is determined during monthly inspections by Sibelco staff and during rehabilitation management surveys undertaken by Kleinfelder.

Weeds are management as part of Sibelco's ongoing commitment to progressive rehabilitation of Northern Dune.

As stated in Section 4, ongoing weed management will be undertaken at Northern Dune moving forward into the next reporting period (refer Appendix R).

6.7 Blasting

Blasting does not occur at Northern Dune.

6.8 Visual, Stray Light

Northern Dune does not operate outside of daylight hours and therefore does not having a lighting system installed.

6.9 Natural Heritage

There were no issues arising from the presence of natural heritage at Northern Dune during the reporting period.

6.10 Spontaneous Combustion

There were no issues or incidents of spontaneous combustion at Northern Dune during the reporting period.

6.11 Bushfire

There were no issues or incidents of bushfire at Northern Dune during the reporting period.

Stockpiles of cleared vegetation are spread strategically around site to minimise the encouragement of bushfire in the area. Stockpiles have a minimum distance of at least 10 m between them.

All mobile plant onsite is equipped with fire extinguishers if a bushfire is ignited. A bushfire emergency procedure and evacuation route is part of the induction and all staff and contractors on site are aware of the process.

No waste or vegetative material is disposed of by burning at Northern Dune.

6.12 Mine Subsidence

There were no issues or incidents of mine subsidence at Northern Dune during the reporting period as there are no underground works.

6.13 Hydrocarbon Contamination

There were no issues or incidents of hydrocarbon contamination at Northern Dune during the reporting period.

As required, no chemicals or mobile plant are stored overnight at Northern Dune which reduces the risk of any hydrocarbon contamination.

This is reflected in Section 5 which relates specifically to the Groundwater Management Plan and the biannual reporting.

A hydrocarbon spill procedure has been developed for the site and is contained within the Environmental Management Plan. This procedure is communicated through the Northern Dune Pollution Incident Response Management Plan and the Northern Dune induction as part of the emergency response plan.

6.14 Methane Drainage / Ventilation

There were no issues relating to methane drainage / ventilation at Northern Dune during the reporting period.

6.15 Public Safety

There were no issues or incidents relating to public safety at Northern Dune during the reporting period.

6.16 Other Issues / Risks

There were no issues or risks reported at Northern Dune during this reporting period.

6.17 Community Relations

There were no community complaints received during this reporting period.

Sibelco maintains an updated community complaints register on the Sibelco Australia / New Zealand website that is updated quarterly to include any new community complaints. Any complaints that are received are elevated to a level 2 incident and investigated internally using the ICAM method.

7 ACTIVITIES PROPOSED IN THE NEXT AEMR PERIOD

As a result of various recommendations made throughout the previous reporting period, Sibelco will be implementing a number of actions moving forward into the next reporting period. Following is a list of activities proposed to be actioned in the next AEMR period:

- Ongoing removal of pampas grass in accordance with Kleinfelder directions
- Follow up inspections to manage regrowth
- Ongoing weed eradication programme over the remainder of the year with the goal of significantly reduce weed infestations
- Removal of road base stockpiles to manage and discourage the growth of invasive grasses along haul roads
- Haul road maintenance and rehabilitation of disused ones

The annual rehabilitation report has determined that weed management and minor, ongoing planting regimes should be continued into the next reporting period. Sibelco will continue to manage rehabilitation commitments to address these actions. As progress reports are compiled throughout the reporting period any actions that arise will be managed accordingly to continue our commitment to the Rehabilitation Management Plan.

Some actions have already been taken into consideration and enacted within this AEMR period as precursors to the preparation of this report. These actions will be continued into the next AEMR period.

- Ongoing implementation and management of a thorough Aboriginal Cultural Heritage Management Plan and liaising with the local Register Aboriginal Parties to minimise any impacts quarry operations might have on Cultural Heritage
- Laser level measurements being recorded with GPS and the data used to produce ongoing maps with GIS software.
- Boundary markers have been setup to define the boundary between Northern Extension Lots 11 – 13 and areas covered by other approvals. As Sibelco moves forward into the new areas the installation of boundary markers will be managed to continue compliance.
- Monitoring exceedances, if found to occur, will be reported per approvals by phone and writing within defined time periods.
- Nest box monitoring will be conducted on annual basis moving forward into the next AEMR period.

Extraction will continue within Northern Extension Lots 11 – 13 moving forward into the next AEMR period. It is forecast that the reserves here will last approximately 12 months and is expected to be complete before the end of the next reporting period.

Any areas that are flagged for improvement from the submission of this AEMR will also be a priority for Sibelco into the next reporting period. Initiating activities aimed at continual improvement of our environmental management systems will take precedence.

8 APPENDICES

Appendices have been attached following the order that they are referenced throughout the document.