
PLANIT
CONSULTING

Review and Amendments Schedule – PLANIT CONSULTING PTY LTD

		Date
Author	EB / LB	June 2015 / December 2015
Reviewer	AS	June 2015 / December 2015

Amendments

Planit Consulting Pty Ltd declares that it does not have, nor expect to have, a beneficial interest in the subject project.

PLANIT CONSULTING PTY LTD©
June 2015

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Executive Summary & Introduction

Introduction & Context

Development consent for Ramtech Pty Ltd's (Ramtech) proposal to construct and operate a sand quarry at Lot 1 in DP 755721 & Lots 1 & 2 in DP 780199 Pottsville Mooball Road, Mooball was granted by the Minister for Planning on 24th November 2008. Schedule 3 of the development consent requires that individual management plans for the key environmental issues be prepared and that environmental management and monitoring conditions be fulfilled. To this end, an EMP was approved by the Department of Planning which integrates the prescribed environmental monitoring programs in accordance with Condition 2 of Schedule 5 into a planning and operations framework.

Construction commenced on a general trial basis in September 2010 with formal commencement occurring in October of 2010. Operations are at a basic level with estimated annual production in the order of 20,000 tonnes per annum only at this stage. The final extraction for the past 12 months is not yet identifiable, however it is estimated at no more than 35,000 tonnes. Full operations (staffed and marketed) commenced in 2011.

Within Schedule 5 of the consent, Condition No.5 requires that within twelve (12) months of the date of the approval and annually thereafter, Ramtech is to submit an Annual Environmental Management Report (AEMR). This AEMR is to be submitted to the Director General of the Department of Planning and other relevant agencies in accordance with the abovementioned Condition 5. This AEMR describes works undertaken, provides a summary and analysis of any complaints and monitoring results, identifies any trends in the monitoring results and identifies any non compliance over the preceding 12 months. Also included is any proposed construction, extraction and rehabilitation activities planned for the following 12 months.

This report represents a six monthly report for presentation to the CCC and for presentation to the DOP. This will be incorporated in to the formal 12 monthly report when appropriate.

Description of Resource

Concrete Sand

The Dunloe Park sand, after washing, is suitable as a concrete sand additive. It is expected that this will be the major use of the sand. Low extraction costs will make the sand competitive within the local Pottsville markets. As sand demand increases, the Dunloe Park sand may become competitive within the Brisbane market.

Loam

Further investigation into loam resources were carried out in mid 2007 (Coffey Geosciences, 2007), the area selected for investigation being the initial mining area proposed for the sand quarry (Gilbert and Sutherland, 2007). A 200m x 200m area approximately 1.2 m deep in the alluvial soil below the topsoil (which averaged approximately 0.3m depth) equating to approximately 90,000t of loam, was sampled by auger drilling and assessed for suitability as a loam.

Fill Material

Fill material represents a portion of demand in South East Queensland and Northern NSW. The sand appears to match Rocla specifications for fill sand in NSW (Rocla, 2007). From investigations carried out by Coffey Mining, it is considered that the Dunloe Park sand can be used as "low grade" fill material which is not dissimilar to fill material supplied into the northern and central coast of NSW. Major local sources of fill include sandstone fill from Kangaroo Creek (near Grafton) which also provides road base and hard materials.

Plastering and Rendering Sand

Coffey Mining is of the opinion that the sand in the Dunloe Park Resource, when washed, will be suitable for lower grade plastering and rendering sand and this is similar to current material supplied into the northern and central NSW market. To confirm this, it is recommended that the following be completed:

• Washed material be prepared and provided to agents for trialing and feedback.

• Laboratory tests be completed for fineness modulus, clay/silt content (<3%), organics and shell content.

Other Uses

Other "specialist" products which fit closely to the grading of the Dunloe Park sands include:

• Golf course sands – colour (usually whiteness) is a major issue.
• Grout sands.
• Fine filter sands.

Sale of these sands (except for local demand) is not considered to be a major opportunity for Dunloe Park due to established marketing strategies (including bagging of filter sands and grout sands) by other manufacturers. If these products are required in the future, then blending with imported (generally coarser size ranges) will be required. This is commonplace within the sand industry.

Dunloe Park *in situ* Indicated Mineral Resources

Pit	Overburden Mm^3	Sand Mm^3	Total Mm^3
North Pit	0.14	3.70	3.84
South Pit	0.08	2.96	3.04
Total	0.22	6.66	6.88

Extraction rates are not to exceed 300,000 tonnes per annum in accordance with Condition 7 of Schedule 2 of the Development Consent. Condition 5 of Schedule 2 provides for operations being permitted until 1 January 2035.

Monitoring

Planit Consulting has been contracted by Ramtech Pty Ltd to prepare this report based on environmental monitoring undertaken upon site by the proponents.

The monitoring includes;

- Blue Green Algae;
- Vegetation Management and Regeneration (refer appendices);
- Groundwater; and
- Surface Water.

All monitoring was undertaken by Ramtech staff.

This report was prepared by Planit Consulting and includes the following;

- Algae Level results for December 2014 to May 2015;
- Ground Water chemical results (pH, EC, DO and RP) for December 2014 to May 2015;
- Quarterly groundwater chemical results (Chloride, Calcium, Magnesium, Sodium, Potassium, Sulphate, Arsenic, Iron and Manganese);
- Quarterly Surface Water chemical results (December 2014, March 2015);
- Rainfall levels from December 2014 to May 2015; and

The Bureau of Meteorology (BOM) recorded rainfall within surrounding suburbs over the 6 month period from December 2014 to May 2015. The recorded rainfall at Byron Bay, for this period, was approximately 1043.4mm, representing a wet start to the year.

Vegetation Management and Regeneration Works

As part of the Dunloe Sand Quarry's approved Environmental Management Plan, re-vegetation and regenerative landscaping is required (Appendix C of the EMP). Ongoing management of the surrounding vegetation is being carried out by Ramtech P/L over the lifetime of the Dunloe Quarry operations.

The regenerative works have been undertaken via a combination of assisted and natural regrowth and all areas have been fenced so as to limit the intrusion of cattle. In this regard, depending on soil types and topography, each of the areas has been very successful in establishing quality regrowth. The only limiting factors have been some cattle getting in and around existing fences (primarily at low tide where they have been able to traverse the creek lines. There are also some areas of extensive grass intrusion that will be subject to ongoing spray control so as to allow for further natural regrowth to occur. The works have been successful to date as referred to above.

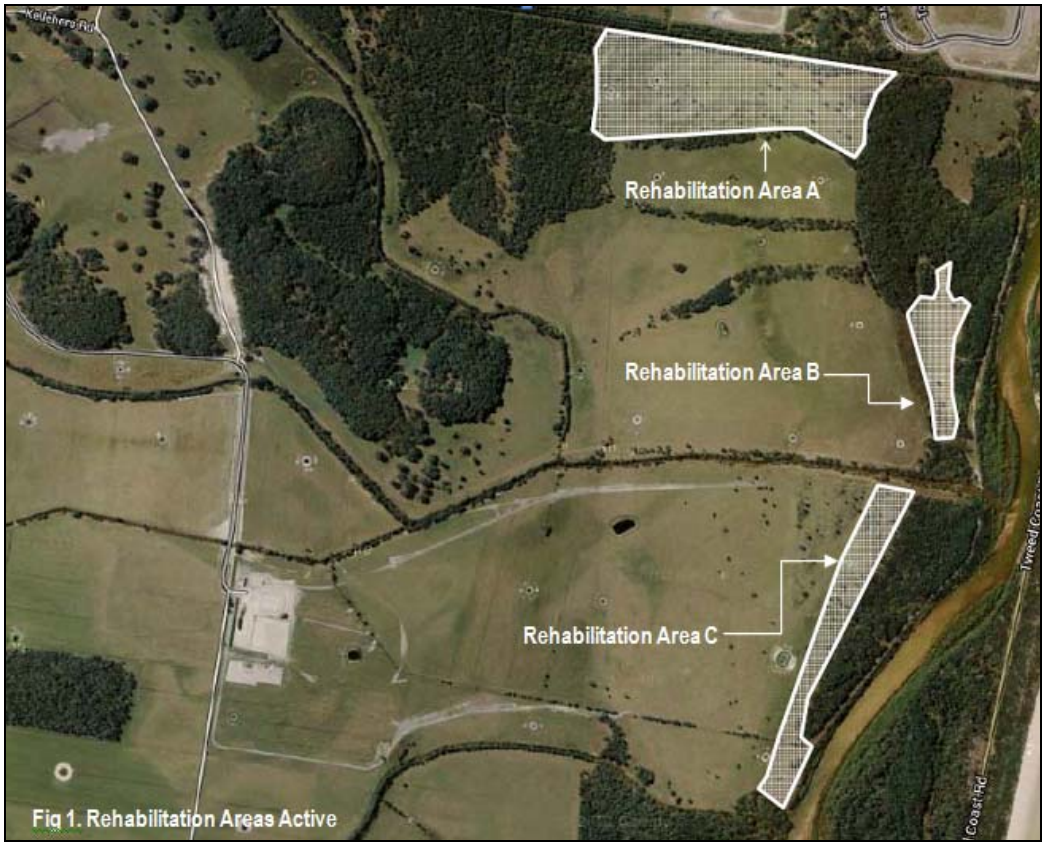

Fig 1. Rehabilitation Areas Active

Complaints Recorded

No complaints have been registered by the proponents to date, however correspondence with the Department of Planning highlighted that the required dust monitoring and noise (monthly) assessments were not being undertaken properly. Since then noise assessments have commenced and a formal review of dust monitoring was undertaken by ASK Consulting. This review resulted in a number of recommended changes due to the nature of the operations. This review has been sent to the Department of Planning for ratification in to the formally approved EMP for the site.

Chapter
1.0 Sampling Program

Sampling Program

Dunloe Sand Quarry conducts environmental monitoring in accordance to Development Consent, Condition 2 of Schedule 5 and the approved Environmental Management Plan (EMP). Ramtech undertake algae, surface water and groundwater monitoring for the project.

Groundwater sites are monitored monthly for pH, EC, Redox Potential and DO and quarterly for Chloride, Calcium, Magnesium, Sodium, Potassium, Sulphate, Arsenic, Iron and Manganese. Samples are collected from sites DLP1, DLP3, DLP5, DLP6 and DLP7. Sites locations are shown on the Ground Water Location Map under Appendix A.

Surface water analysis includes pH, electro-conductivity (EC), dissolved oxygen (DO), suspended solids, total phosphorus and total nitrogen and is conducted quarterly at sites SW3, SW4, SW9 and SW10. Site locations are depicted within the Surface Water Location Map under Appendix B.

All of the Sampling Raw Data that has been used to compile this report is included in Appendix C.

Chapter
2.0 Monthly Monitoring Results

2.1 Algae Results

The results of the algae monitoring for the period of November 2013 to October 2014 are displayed within Table 1. Results are presented in cells/mL.

Table 1: Dunloe Sands – Lake – Algae Results November 2014 to May 2015

	11 2014	16/12 2014	22/01 2015	26/02 2015	27/03 2015	27/04 2015	29/05 2015	
Cyanophyta (cells/mL)	-	-	-	-	-	-	-	-
Chlorophyta (cells/mL)	-	106,500	37,000	<100	8,750	8,000	76,000	211,000

The Cyanophyta results gathered between December 2014 and June 2015 remains low being <100 cells/mL.

The Chlorophyta results gathered between December 2014 and May 2015 detail mixed results as has been traditional on this site. Consultation was undertaken with the Blue Green Algae expert nominated in the EMP (Paul Wright from the Tweed Laboratory), who explained that high Chlorophyta results do not represent an exceedance of the EMP threshold as the risk is evidently related to the Cyanophota results and not Chlorophyta results. Advice received is that it is quite normal for Chlorophyta results to vary markedly and that high readings are not dangerous or indicative of any other potential cause for concern.

It is noted that there is a high reading on May and this contradicts earlier observations that there is potential correlation between high temperatures and low rainfall (and increased Chlorophyta results), however advice received also indicates that again there is no apparent direct reason for increase levels and that such readings are representative of other quarries in the local area.

Continued monitoring will ensure the conditions relating to green algae growth are monitored and reduced where possible. No potentially hazardous levels of Cyanophyta were noted. Furthermore continued efforts will be required to ensure organic soil materials from the upper stratum and bird droppings are not contaminating the lake.

Strict adherence to the minimum monthly sampling is also required as it is noted that no result has been given for February. Contact has been made with the Laboratory in this regard.

2.2 Ground Water

Monthly ground water monitoring was conducted between December 2014 and May 2015. Samples monitored the pH, EC, Redox Potential and DO levels of five (5) sample sites. The locations of the DLP sites are illustrated within the Ground Water Locations Map - Appendix A.

The results are displayed within four separate graphs illustrating the results of each test site over the twelve (12) month monitoring period. Figure 2 depicts the pH test results, Figure 3 illustrates the EC, Figure 4 shows the Redox Potential and Figure 5 shows DO levels.

2.3 Groundwater Depth

Ground water was encountered in all boreholes at between 1.2m and 950mm below the natural surface level.

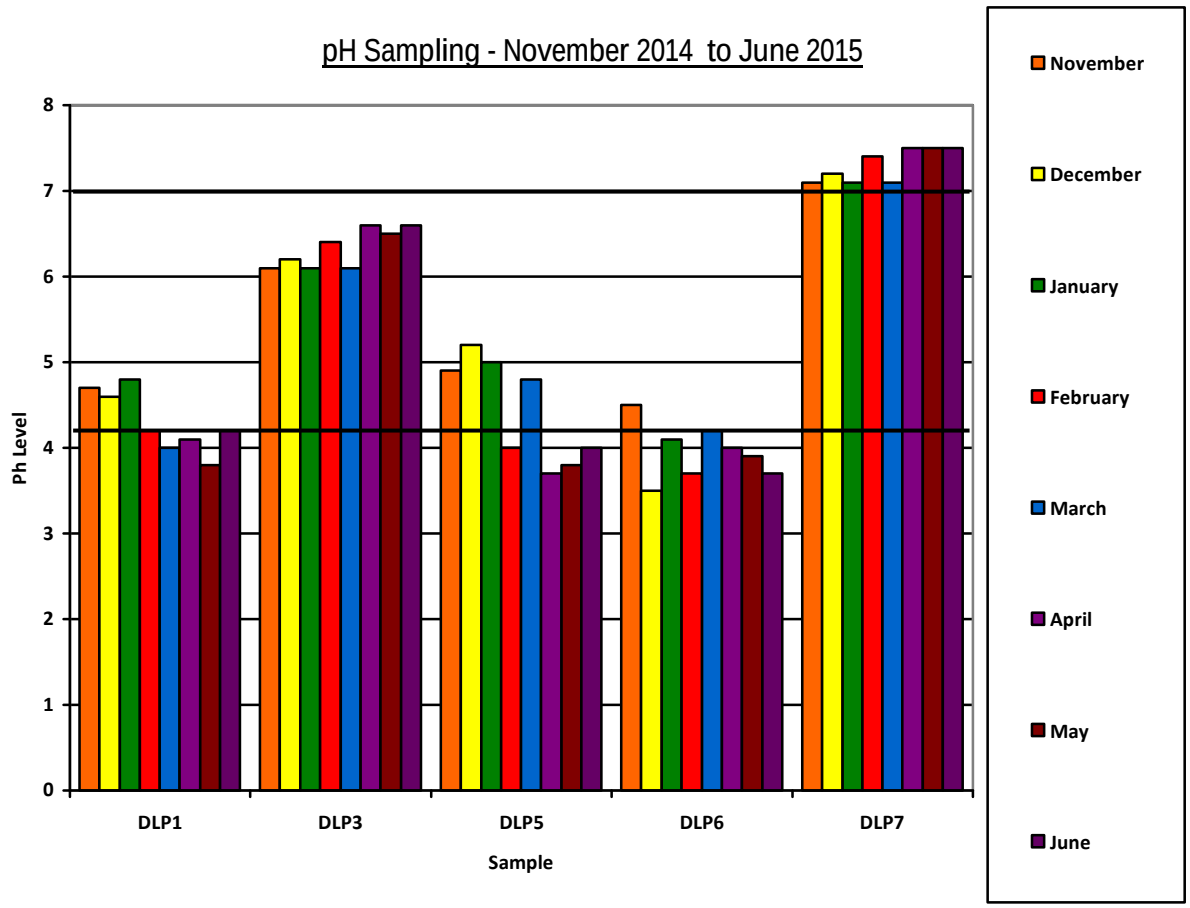

Figure 1: Dunloe Sands - Ground Water - Chemical (pH Test) Results November 2014 to June 2015

The EMP provides the interim target range regarding the pH levels of ground water sampling. The majority of the results displayed are between the minimum of 4.2pH and maximum of 7.0pH (shown as black lines). DLP 7 shows all samples outside of the maximum interim target levels by between 0.1 and 0.6pH. This presents a more alkaline pH level than the target range. These minimal exceedances of pH at DLP7 are not considered to be of any significance as small fluctuations in groundwater pH is common within regions which experience both high and low levels of rainfall and are consistent with background levels which were consistently acidic before operations commenced.

DLP1, 5 and 6 record samples below the 4.2pH interim target. This presents a more acidic pH level than the target range. This is considered to have been caused by significantly high levels of rainfall following dry periods and generally low lying environments conducive to acidic soils (<4m AHD). It is probable in this regard that organic acidity has leached in to the shallow ground water from surrounding low lying soils during rainfall events. The majority of results present within the target range and therefore the sampling for the year in considered to be generally consistent with the EMP requirements and background readings.

As with earlier reports, there is potential also for DLP 5 & 6 to require flushing in order to ensure accurate readings. The proponents are aware of this and have been requested to monitor the accuracy of each sample point and to ensure flushing is undertaken at six monthly intervals.

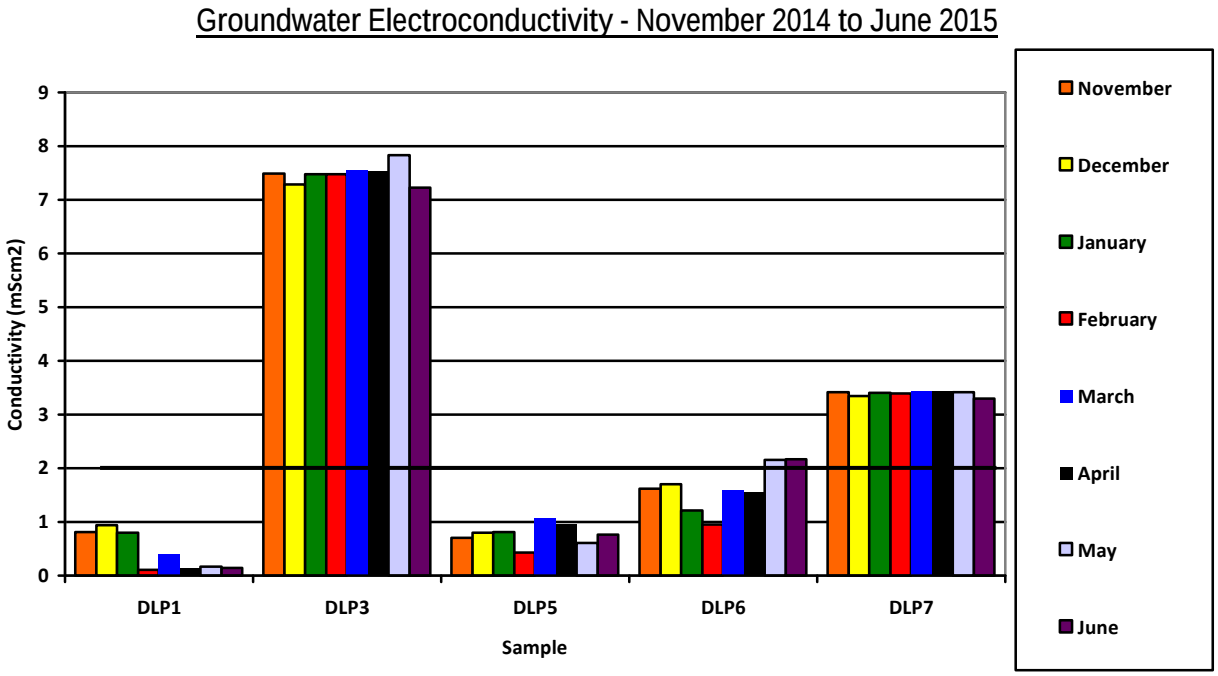

Figure 2: Dunloe Sands - Ground Water - Chemical (EC Test) Results November 2014 to June 2015

The majority of the samples taken produce considerably low EC levels when compared to the EMP maximum interim target of 2.00mS/cm2. However, two samples sites; DLP3 and DLP7 present conductivity levels above the maximum interim target of 2.00mS/cm2 stated within the EMP (shown as a black line). These sites have also expressed similar levels of EC within background testing. This can be explained by the sampling wells being installed in the low-lying portion of the floodplain. The wells are adjacent to sections of Mooball Creek and the main agricultural drainage line which can be subject to tidal influences. It is therefore considered likely that some localised salinisation of surficial groundwater has occurred within the vicinity of monitoring locations DLP3 and DLP7, albeit at levels consistent with background readings.

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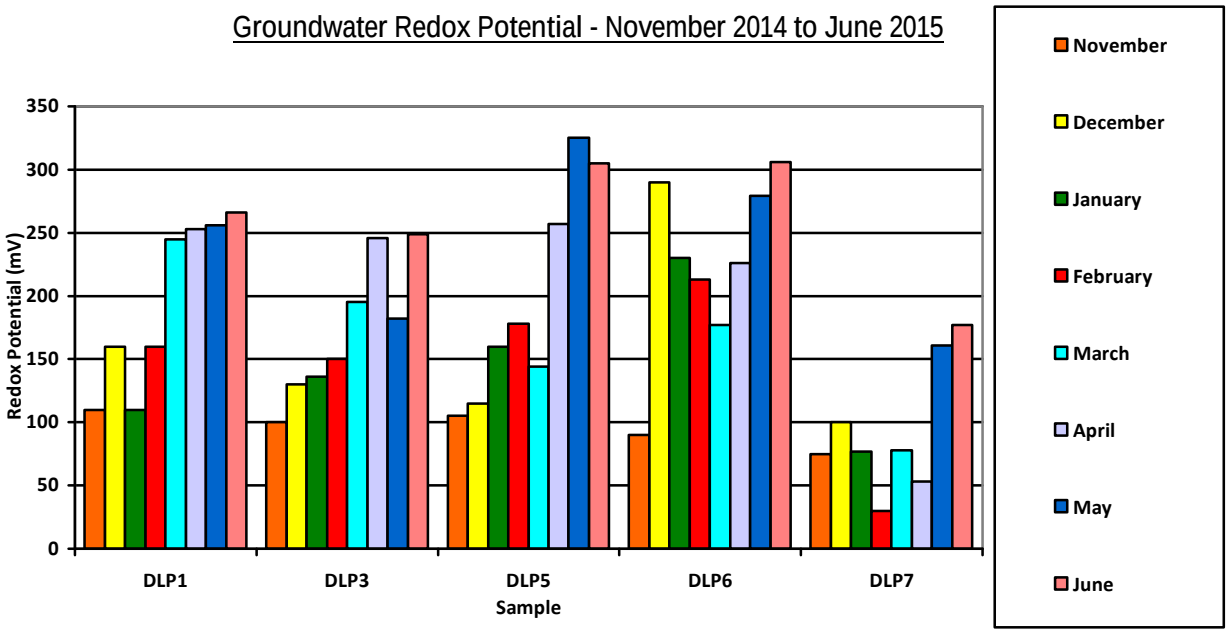

Figure 3: Dunloe Sands - Ground Water - Chemical (Redox Potential Test) Results November 2014 to June 2015

The EMP does not provide an interim target level for Redox Potential but instead states that results should be monitored for outlier samples. All samples present in a uniform manner, with no outliers present. High levels generally correspond with higher than normal periods of rainfall.

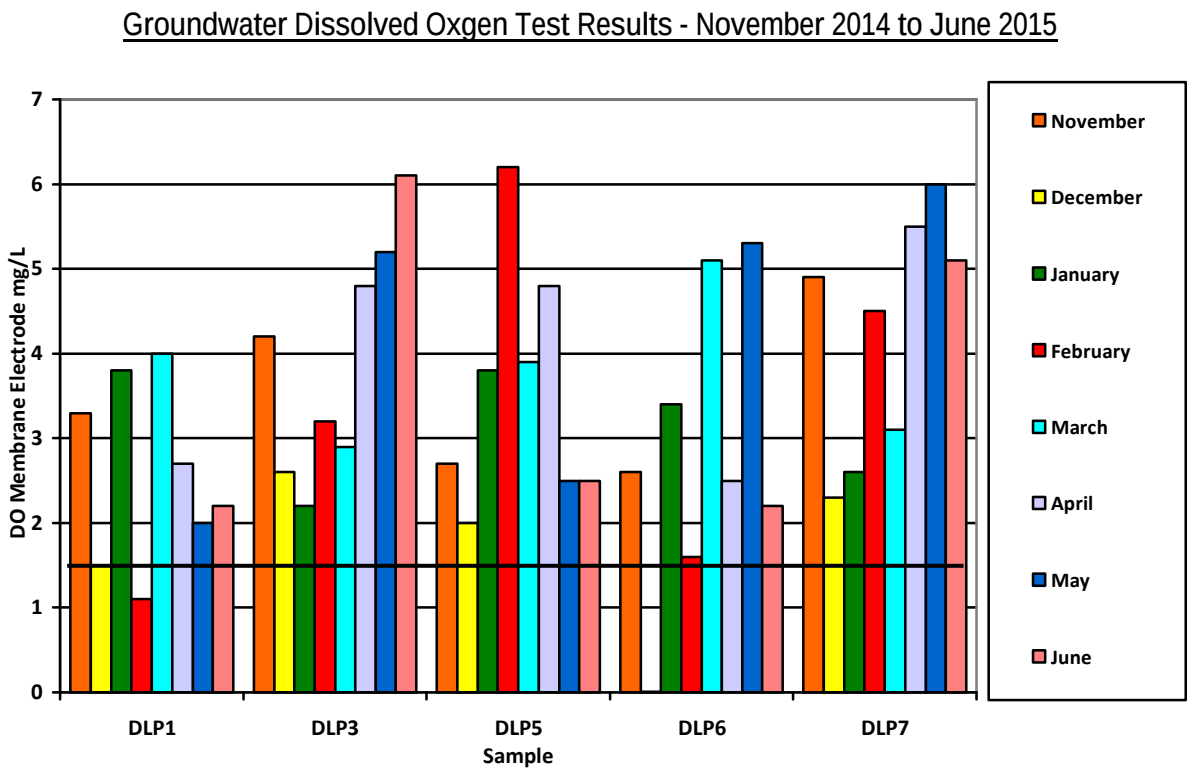

Figure 4: Dunloe Sands - Ground Water - Chemical (DO Test) Results November 2014 to June 2015

The minimum DO level provided within the EMP is 1.5mg/mL (shown as a black line). The results vary in DO levels considerably with the majority not presenting or conforming to a pattern over the monitoring period. The majority of the groundwater samples that were collected are above the minimum interim target however one sample collected from DLP 1 presented levels below the target. The improvements in DLP 7 & 3 continue to be pleasing and reverse the trend from the previous periods.

Whilst background testing indicated generally low DO levels inherently across the site, the result for February for DLP 1 is likely indicative of exceedingly warm temperatures increased rainfall for the month of February (>250mm). All results require further consideration by the sampler, particularly with respect to the temperature of samples at these locations as exceedingly warm samples will automatically generate a low DO reading. Low results may also be related to excessive faecal matter and nutrients associated with livestock use and access to the testing sites given that these are placed in open accessible areas. Each of these potential reasons should be considered in the context of future sample results so as to look towards potential ameliorative measures when required. Nevertheless, we note that background readings for DLP 1 were often below the minimum target set.

2.3 Lake Samples

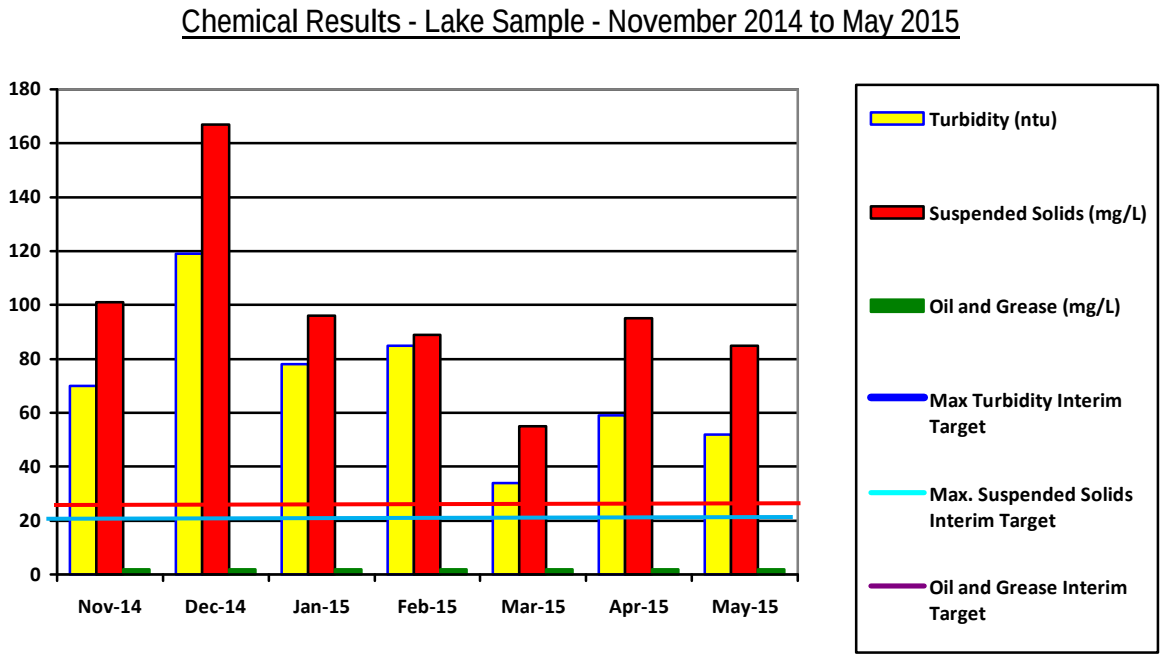

Figure 5: Dunloe Sands - Lake - Chemical Results – November 2014 to May 2015

Interim target levels for turbidity present a maximum level of 20ntu within the EMP. The levels recorded over the monitoring period show levels above the maximum levels during the majority of samples, primarily it is considered due to the presence of the dredging apparatus on site which would understandably increase turbidity levels. In this regard, the site does not have a permanent dredge on site, rather it relies upon the hire of a suitable machine after which stockpiles are created. It is also noted that well over 1000mm of rain has been recorded in the monitoring period corresponding with high turbidity readings. This is entirely expected given both high rainfall and active dredging.

The maximum interim target level for the suspended solids within the EMP is 25mg/L. Results for this element also demonstrate exceedances across the board, however suspended solids and turbidity are both interrelated and hence high levels of one will automatically in most circumstances result in high levels of the other.

The EMP states a maximum level of 10mg/L in regard to oil and grease. Levels of oil and grease within the samples are consistent over the six month monitoring period at less than 2mg/L.

Additional cross referencing of results will be needed against times when active dredging is not underway.

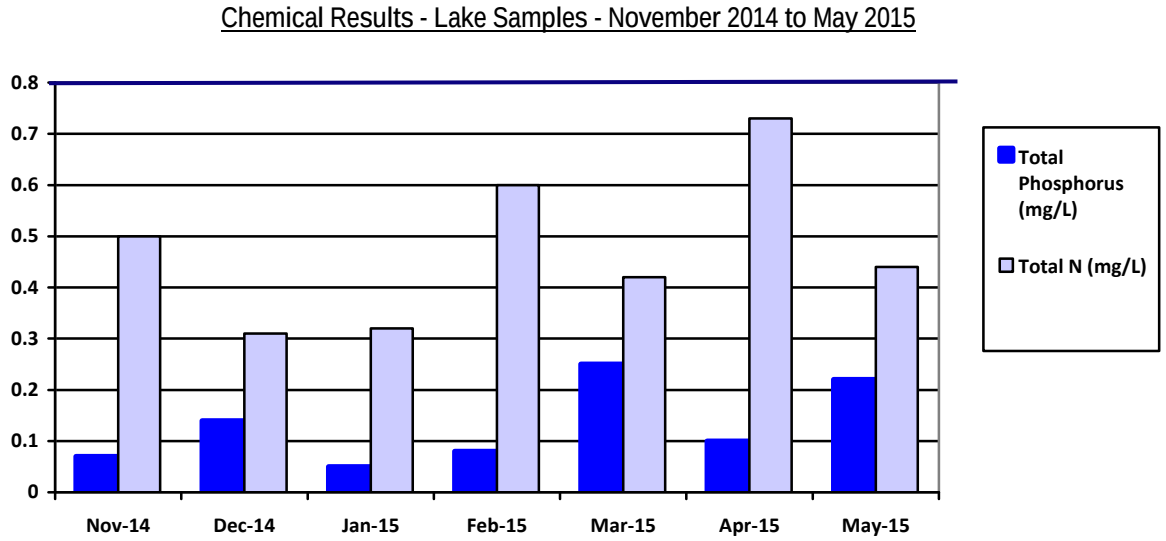

Figure 6: Dunloe Sands - Lake - Chemical Results – November 2014 to May 2015

Total phosphorus levels have a maximum interim target of 0.8mg/L (shown as red line). All sample data results in levels of below the maximum interim target levels contained within the EMP.

Total nitrogen levels remain consistently lower than the interim target of 20mg/L with a maximum result of circa 0.72 mg/L.

2.4 Recorded Rainfall

The Bureau of Meteorology (BOM) have recorded rainfall within the surrounding area of Byron Bay (28.5km from Pottsville). The results are illustrated within Figure 8 along with the recorded rainfall average.

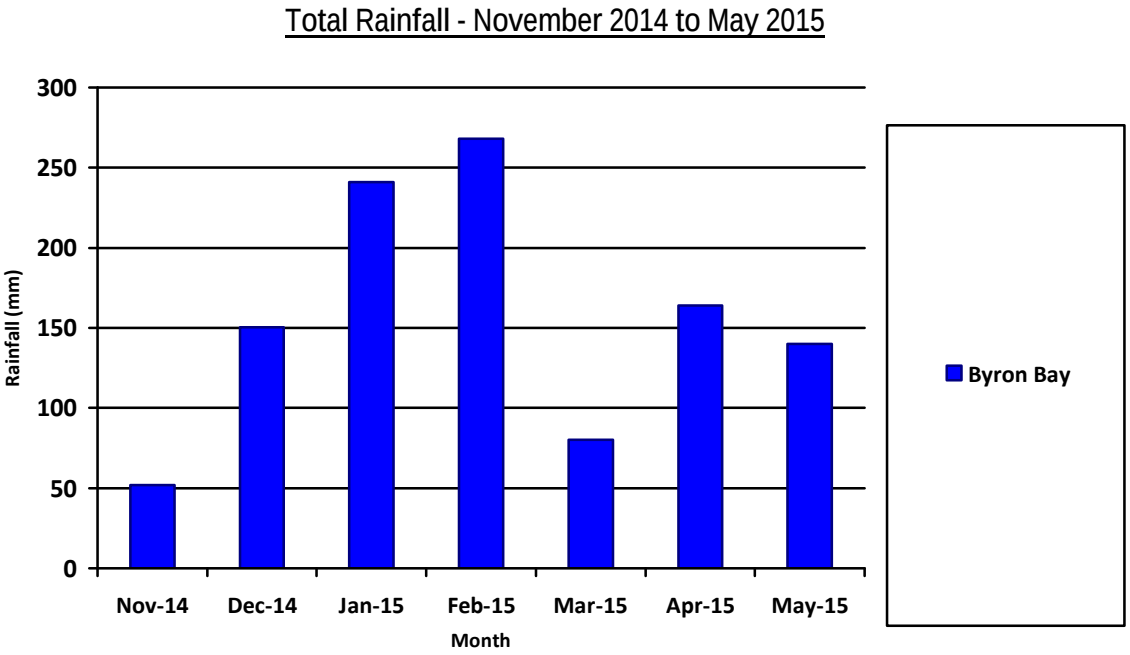

Figure 7: Recorded Rainfall November 2014 to May 2015 (graph needs to change start month)

The recorded rainfall of the three suburbs surrounding Pottsville has been averaged to produce an approximate on-site rainfall. In total over the six month period approximately 1043.4mm of rain was recorded on-site.

Chapter
3.0 Quarterly Monitoring Results

3.1 Quarterly Ground Water Chemical Results

Quarterly monitoring of the ground waters on-site from locations DLP 1, DLP 3, DLP 5, DLP 6 and DLP 7 have been undertaken to determine levels of chloride (Table 2), calcium (Table 3), magnesium (Table 4), sodium (Table 5), potassium M8 (Table 6), sulphate (Table 7), arsenic (Table 8), iron (Table 9) and Manganese (Table 10). Samples were collected in December 2014, March 2015 and June 2015.

Tables present the results compared against the interim target criteria contained within the EMP.

The majority of the samples collected are consistent with the interim target criteria of the EMP. Some variants are illustrated within the results. These variants have been highlighted with bold text.
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Table 2: Dunloe Sands - Ground Water - Chemical (Chloride Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	15	2,370	220	<3	780
Interim Target	285.0	285.0	285.0	285.0	285.0
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	26	2,360	300	<3	780
Interim Target	285.0	285.0	285.0	285.0	285.0
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	24	2370	180	<50	780
Interim Target	285.0	285.0	285.0	285.0	285.0

Comments: As highlighted previously, two (2) samples sites (DLP3 and DLP7) presented conductivity levels above the maximum interim target of 285mg/L stated within the EMP, each of which also expressed similar levels of EC within background testing. The latter also correlates with the high chloride levels shown above, which indicate a high level of saltwater intrusion at these points. This is quite easily explained as these sampling wells have been installed in the low lying portion of the floodplain adjacent to the sections of Mooball Creek and the main agricultural drainage line that are subject to tidal influences. It is also not unexpected in the instance of DLP 7 given that it sits immediately adjacent the existing wetland which would in itself act as a 'drawer' of permanently saline conditions in order to sustain its dominant vegetative makeup. It is therefore considered likely that some localised salinisation of surficial groundwater has occurred within the vicinity of DLP3 and DLP7 due to tidal influences within these nearby waterways and wetlands. It is noted that these results are consistent with background readings.

The slight exceedance in DLP 5 in March would likely result from the higher than average rainfalls in February which exceeded 250mm for the month.

Table 3: Dunloe Sands - Ground Water - Chemical (Calcium Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	1.6	82	6.2	134	22
Interim Target	55.0	55.0	55.0	55.0	55.0
March	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7

2015					
Sample	30	72	7.6	94	18
Interim Target	55.0	55.0	55.0	55.0	55.0
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.5	76	4.9	43	18
Interim Target	55.0	55.0	55.0	55.0	55.0

NB. Major cation

Comments: The spike associated with the DLP3 sample is consistent with background testing and consistent with the sites location proximate to the adjacent tidal waterway. The results for increased calcium in DLP 6 are somewhat odd and not consistent with background readings, although results reduced again for the June reading. Whilst the increased calcium readings indicate that DLP 6 was 'hard', this may be able to explained by the higher than average rainfalls and leaching of calcium in to the bore during this period, most probably due to the application of lime in proximity to the work area. Water hardness in most groundwater is naturally occurring from weathering of limestone, sedimentary rock and calcium bearing minerals.

To be monitored for trends.

All other samples present at levels lower than the interim target.

Table 4: Dunloe Sands - Ground Water - Chemical (Magnesium Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.4	118	15	26	43
Interim Target	40.0	40.0	40.0	40.0	40.0
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	4.1	108	18	22	38
Interim Target	40.0	40.0	40.0	40.0	40.0
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.4	116	8.8	25	38
Interim Target	40.0	40.0	40.0	40.0	40.0

NB. Major cation

Comments: The spike associated with DLP3 is consistent with background testing and consistent with the sites location proximate to the adjacent tidal waterway. All other samples present at levels lower than the interim target.

Table 5: Dunloe Sands - Ground Water - Chemical (Sodium Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	10	1,240	110	24	685
Interim Target	280.0	280.0	280.0	280.0	280.0
March	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7

2015					
Sample	14	1,200	142	19	651
Interim Target	280.0	280.0	280.0	280.0	280.0
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	14	1,250	92	17	652
Interim Target	280.0	280.0	280.0	280.0	280.0

NB. Major cation

Comments: As highlighted previously, two (2) sample sites (DLP3 and DLP7) presented conductivity levels above the maximum interim target of 280mg/L stated within the EMP, each of which also expressed similar levels of EC within background testing. The latter also correlates with the high sodium levels shown above, which indicate a high level of saltwater intrusion at these points. This is explained as the sampling wells were installed in the low-lying portion of the floodplain adjacent to the sections of Mooball Creek and the main agricultural drainage line that are subject to tidal influences. It is also not unexpected in the instance of DLP 7 given that it sits immediately adjacent the existing wetland, which would in itself act as a 'drawer' of permanently saline conditions in order to sustain its dominant vegetative makeup. It is therefore considered likely that some localised salinisation of surficial groundwater has occurred within the vicinity of DLP3 and DLP7 due to tidal influences within these nearby waterways and wetlands.

Table 6: Dunloe Sands - Ground Water - Chemical (Potassium M8 Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<5	48	<5	10	29
Interim Target	17.5	17.5	17.5	17.5	17.5
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<5	46	<5	8	26
Interim Target	17.5	17.5	17.5	17.5	17.5
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<5	42	<5	8	24
Interim Target	17.5	17.5	17.5	17.5	17.5

NB. Major cation

Comments: As highlighted previously, two (2) samples sites (DLP3 and DLP7) presented conductivity levels above the maximum interim target of 17.5mg/L stated within the EMP, each of which also expressed similar levels of EC within background testing. The latter also correlates with the high potassium levels shown above, which indicate a high level of saltwater intrusion at these points. This is quite easily explained as the sampling wells were installed in the low-lying portion of the floodplain adjacent to the sections of Mooball Creek and the main agricultural drainage line that are subject to tidal influences. It is also not unexpected in the instance of DLP 7 given that it sits immediately adjacent the existing wetland, which would in itself act as a 'drawer' of permanently saline conditions in order to sustain its dominant vegetative makeup. It is therefore considered likely that some localised salinisation of surficial groundwater has occurred within the vicinity of DLP3 and DLP7 due to tidal influences within these nearby waterways and wetlands. Efforts to date to clear these wells have not had a noticeable impact upon readings, indicating that levels are naturally high in this regard.

Table 7: Dunloe Sands - Ground Water - Chemical (Sulphur as Sulphate Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	6.1	146	11	768	211
Interim Target	175	175	175	175	175
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	128	178	25	892	250
Interim Target	175	175	175	175	175
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	14	179	29	1,500	241
Interim Target	175	175	175	175	175

Comments: Minor exceedances were experienced during both sampling periods at DLP 7 and in DLP 3 in March. These exceedances are very small. Background testing shows that DLP 7 and DLP 3 have previously tested with high test results.

Larger exceedances inconsistent with previous sampling was identified again (also present in August 2014) for DLP 6. This will need to be monitored at the next round to determine if there are any ongoing trends in this regard. It is noted that the background pH readings for this bore were in the order of 4.65 pH, which would indicate that this area is naturally acidic. Nevertheless the exceedances here require further consideration and potentially greater flushing efforts of this bore in coming months.

Table 8: Dunloe Sands - Ground Water - Chemical (Arsenic Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Interim Target	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.002	< 0.001	< 0.001	0.017	< 0.001
Interim Target	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.001	<0.001	<0.001	0.013	<0.001
Interim Target	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

Comments: The samples are fully compliant with the interim targets as set out by the EMP, with the exception of a small exceedance at DLP 6. This is not representative of background and whilst it may appear as a result of natural movement of naturally occurring arsenic through the site, the proximity of this bore to the work site requires further consideration relative to potential risks that might exist. This will be monitored in coming results.

Table 9: Dunloe Sands - Ground Water - Chemical (Iron Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	2.55	3.53	14.0	322	1.62
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	5.14	3.66	17.7	265	2.62
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	3.84	2.13	4.90	382	2.53
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5

Comments: Exceedance of the target iron levels is noted at DLP 6 and DLP 5. Background testing suggests a history of DLP6 and a high reading of iron, albeit the levels highlighted in this round of sampling are higher than background and therefore are warranting of review. DLP 5 is in accord with background levels.

Table 10: Dunloe Sands - Ground Water - Chemical (Manganese Test) Results (mg/L)

December 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7

Sample	0.02	0.59	0.08	1.91	0.06
Interim Target	0.15	0.15	0.15	0.15	0.15
March 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.351	0.681	0.130	2.31	0.077
Interim Target	0.15	0.15	0.15	0.15	0.15
June 2015	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.11	0.570	0.052	2.94	0.019
Interim Target	0.15	0.15	0.15	0.15	0.15

Comments: Manganese is typically associated brackish or slightly saline conditions. The readings at DLP3 are roughly equivalent with background sampling. Efforts to date to clear these wells have not had a noticeable impact upon readings, indicating that levels are naturally high in this regard. High trending results are established in DLP 6 (close proximity to the work site), indicating movement of manganese within the water table. To be monitored, however no real risk likely in respect of results shown.

3.2 Surface Water Results

Quarterly monitoring of the surface waters on site within locations SW 3, SW4, SW9 and SW10 sample water for levels of pH (Table 11), EC (Table 12), DO (Table 13), suspended solids (Table 14), phosphorus (Table 15) and nitrogen (Table 16). Samples were collected in December 2013, March, June and August 2014. Tables present the results compared against the interim target criteria contained within the EMP.

The majority of the samples collected are consistent with the interim target criteria of the EMP. Some variants are illustrated within the results. These variants have been highlighted with bold text.

Table 11: Dunloe Sands - Surface Water - Chemical (pH Test) Results (pH)

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	7.7	8.0	8.0	7.6
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	3.7	3.7	4.2	4.2
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
June 2015	SW 3	SW 4	SW 9	SW 10
Sample	4.7	4.9	4.7	4.4
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5

Comments: BOM stats indicate sampling undertaken 48 hours after 48mm rain event which is likely to have facilitated a flush in the system hence the lower pH results. Note that no break in bund was evident or any leakage from the work area detected hence all results are likely associated with activities in the upper catchment, particularly as all exceedances were

evident both up and downstream from the quarry and hence the cause of the increased acidity may well have been further up the catchment

Review of background readings also indicate that at various times (shoulders) there appears to be naturally low pH levels in all sampling locations due to mobilisation of Acid I the soil profile.

Table 12: Dunloe Sands - Surface Water - Chemical (EC Test) Results (uS/cm^{-1})

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	30,732	29,527	26,966	26,936
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	1,834	1,426	763	779
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500
June 2015	SW 3	SW 4	SW 9	SW 10
Sample	1,071	571	460	383
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500

Comments: All of the December samples taken exceeded the interim target levels outlined within the EMP. The March samples show all samples within acceptable levels.

Saltwater has a high level of electro conductivity and therefore saltwater intrusion is considered overwhelmingly the most likely explanation for the high December sample readings, particularly as saltwater exhibits similar readings to those identified above.

It is considered likely that the samples were taken with the incoming tide, therefore giving a higher than normal reading. Further advice is to be given to the proponent with respect to sampling methods in this regard.

All readings, including the elevated December samples are consistent with background readings.

Table 13: Dunloe Sands - Surface Water - Chemical (DO Test) Results - (mg/L)

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	7.9	10	10	12
Interim Target	> 4	> 4	> 4	> 4
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	4.8	4.7	5.2	5.6
Interim Target	> 4	> 4	> 4	> 4
June 2015	SW 3	SW 4	SW 9	SW 10

Sample	8.0	8.6	8.3	7.3
Interim Target	> 4	> 4	> 4	> 4

Comments: All of the samples taken are compliant with the interim target levels outlined within the EMP, with the exception of the December surface water samples at each point. This corresponds with higher suspended solids (refer below) and high rainfall for this month. It was also observed that the high December rainfall came on the back of high summer temperatures. These results were then observed to recede with lower temperatures through to the March sampling results.

Table 14: Dunloe Sands - Surface Water - Chemical (Suspended Solids Test) Results (mg/L)

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	35	33	37	44
Interim Target	< 25	< 25	< 25	< 25
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	23	24	5.8	8.0
Interim Target	< 25	< 25	< 25	< 25

Comment: Generally all readings were satisfactory, however slightly increased levels were recorded in December which corresponded with heavy rainfall activity (>150mm fell in December). Reduced readings were evident in March sampling as only 80mm fell in this period.

All results, including the elevated December results are consistent with Background results.

Table 15: Dunloe Sands - Surface Water - Chemical (Total Phosphorus Test Results (mg/L)

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	0.03	0.05	0.08	0.07
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	0.04	0.10	0.02	0.06
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08

Comments: The majority of the samples taken are compliant with the interim target levels outlined within the EMP. SW4 presented levels slightly greater that the interim target in March, however these exceedances are quite minor and not representative of earlier results.

All results are consistent with background readings.

Table 16: Dunloe Sands - Surface Water - Chemical (Total Nitrogen Test) Results (mg/L)

December 2014	SW 3	SW 4	SW 9	SW 10
Sample	0.36	0.86	1.52	1.38
Interim Target	< 20	< 20	< 20	< 20
March 2015	SW 3	SW 4	SW 9	SW 10
Sample	1.32	1.15	1.04	1.08
Interim Target	< 20	< 20	< 20	< 20

Comments: All of the samples taken are compliant with the interim target levels outlined within the EMP.

3.3 Noise Monitoring

Noise monitoring of potentially sensitive sources has been undertaken pursuant to the EMP.

These assessments were undertaken on the following dates:-

a. January 2015 – Friday the 30th
b. February 2015 – Thursday the 26th
c. March 2015 – Monday the 30th
d. April 2015 – Thursday the 30th
e. May 2015 – Friday the 29th
f. June 2015 – Monday the 29th

All results were taken in the morning between the hours of 7.30am and 9am. All results were monitored using Centre 320 Series Sound Level Meter (tripod fixed).

Results were taken from three locations as identified in the EMP. On each occasion, the site operations have been inaudible above background. This was further demonstrated when ASK consulting were asked to undertake a reading whilst also reviewing the air quality parameters for the operation, wherein they were also unable to register readings for the operation. It is pertinent to note that volumes being extracted from the operation are far below that which the approval granted consent for and hence it is not unexpected that noise levels are unable to be recorded.

3.4 Vegetation Rehabilitation & Regeneration

As part of the Dunloe Sand Quarry's approved Environmental Management Plan, re-vegetation and regenerative landscaping is required (Appendix C of the EMP). Ongoing management of the surrounding vegetation is being carried out by Ramtech P/L over the lifetime of the Dunloe Quarry operations.

The regenerative works have been undertaken via a combination of assisted and natural regrowth and all areas have been fenced so as to limit the intrusion of cattle. In this regard, depending on soil types and topography, each of the areas has been very successful in establishing quality regrowth.

Monitoring sheets reflective of the progress of regeneration areas are included at Appendix D.

Chapter
4.0 Conclusion

4.1 Conclusion

This report represents the ongoing monitoring for the operation of the Dunloe Sands Quarry. It is to be utilised in respect of operational compliance and environmental characteristics on the site, as well as to be cross referenced with future monitoring reports. This will allow the identification of potential trends and areas requiring intervention and environmental amelioration.

The results within this report demonstrate that the environmental characteristics on-site remain consistent with background readings and within the acceptable limit set out within the consent and approved EMP.

Luke Blandford
Town Planner
Planit Consulting

June 2015

Adam Smith
Director
Planit Consulting

June 2015

Steve Petersen
Director
RAMTECH

June 2015

Appendix A
Ground Water Location Map

200 0 200 400 500

Legend

- Stage 01 Ground Water Monitoring Location
- Stage 02 Ground Water Monitoring Location
- Stage 01 & 02 Ground Water Monitoring Location
- Excavation Area

DUNLOE PARK - GROUNDWATER MONITORING

MOOBALL - NSW

Scale: 1:8000 @ A3

Date: MARCH 2012

N

1 of 1

Level 1 2247 Gold Coast Hwy
Nobby Beach
PO Box 206 Nobby Beach QLD 4218

Telephone: 07 5526 1500
Fax: 07 5526 1502
admin@planitconsulting.com.au

PLANIT CONSULTING

Appendix B
Surface Water Location Map

200 0 200 400 500

Legend

Stage 01 & 02 Surfacewater Monitoring Location

Excavation Area

DUNLOE PARK - SURFACEWATER MONITORING

MOOBALL - NSW

Scale: 1:8000 @ A3

Date: MARCH 2012

N

1 of 1

Level 1 2247 Gold Coast Hwy
Nobby Beach
PO Box 206 Nobby Beach QLD 4218

Telephone: 07 5526 1500
Fax: 07 5526 1502
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PLANIT CONSULTING

Appendix C
Sampling Raw Data

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake - Algae

Lims1 Report No: 14/3330-A
Date Testing Completed: 16/12/2014
Date of Report: 16/12/2014

	Algal Identification	Method Code	Units	Count
LIMS NO. 14/3330-A/1				
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	106,500
	Diatoms (Bacillariophyta)	B9	cells/mL	220
	Dinophyta (Dinoflagellates)	B9	cells/mL	35

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samplereception@tweed.nsw.gov.au ABN: 90 178 732 496
(All correspondence. Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweed.nsw.gov.au/tweedlab/

FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd
Address: 30-32 Lundberg Drive
MURWILLUMBAH
NSW 2484

Lims1 Report No: 14/3330-C
Attention: Steve Peterson **Client Reference:** PLUS HARD COPY
Copy To: Fax: 02 6672 3896 & Adam Smith **Date of Report:** 31/12/2014

All pages of this Report have been checked and approved.
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Taken By:	Client	**No of Samples:**	10
Date Taken:	15/12/2014	**Date Testing Commenced:**	16/12/2014
Date Received:	16/12/2014	**Date Testing Completed:**	31/12/2014

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample/Site Identification	Sample/Site Description
1	Lake
2	DLP 1
3	DLP 3
4	DLP 5
5	DLP 6
6	DLP 7
7	SW 3
8	SW 4
9	SW 9
10	SW 10

COMMENTS:

NP = Not Present.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Paul J Wright
(Laboratory Coordinator)
paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 14/3330-C
Date Testing Completed: 31/12/2014
Date of Report: 31/12/2014

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			Lake	DLP1	DLP3	DLP5	DLP6
Date Taken:			15/12/2014	15/12/2014	15/12/2014	15/12/2014	15/12/2014
Date Received:			16/12/2014	16/12/2014	16/12/2014	16/12/2014	16/12/2014
Date Testing Commenced:			16/12/2014	16/12/2014	16/12/2014	16/12/2014	16/12/2014
Test	Method	Units	14/3330-C-1	14/3330-C-2	14/3330-C-3	14/3330-C-4	14/3330-C-5
pH	P1	pH units	4.4	4.6	6.2	5.2	3.5
Conductivity	P2	μScm^{-1}	1,005	94	7,280	801	1,700
DO (membrane electrode)	P12	mg/L	8.0	1.5	2.6	2.0	<0.1
*Redox Potential	P16	mV	-----	+160	+130	+115	+290
Alkalinity as $CaCO_3$	C10	mg/L	NP	NP	130	5	NP
Bicarbonate HCO_3	C10	mg/L	<1	<1	77	3	<1
Turbidity	P8	NTU	119	-----	-----	-----	-----
Suspended Solids	P4	mg/L	167	-----	-----	-----	-----
Oil and Grease	C8	mg/L	<2	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	0.14	-----	-----	-----	-----
Total-N	C55	mg/L	0.31	-----	-----	-----	-----
Chloride	C20	mg/L	40	15	2,370	220	<3
Calcium	M8	mg/L	159	1.6	82	6.2	134
Magnesium	M8	mg/L	18	0.4	118	15	26
Sodium	M8	mg/L	29	10	1,240	110	24
Potassium M8	M8	mg/L	7	<5	48	<5	10
Sulphur as Sulphate	M8	mg/L	394	6.1	146	11	768
Aluminium (Total)	M8	mg/L	33.0	0.32	0.04	0.30	10.0
Arsenic (Total)	M7	mg/L	0.008	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	11.0	2.55	3.53	14.0	322
Manganese (Total)	M8	mg/L	1.23	0.02	0.59	0.08	1.91

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 14/3330-C
Date Testing Completed: 31/12/2014
Date of Report: 31/12/2014

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			DLP7	SW3	SW4	SW9	SW10
Date Taken:			15/12/2014	15/12/2014	15/12/2014	15/12/2014	15/12/2014
Date Received:			16/12/2014	16/12/2014	16/12/2014	16/12/2014	16/12/2014
Date Testing Commenced:			16/12/2014	16/12/2014	16/12/2014	16/12/2014	16/12/2014
Test	Method	Units	14/3330-C-6	14/3330-C-7	14/3330-C-8	14/3330-C-9	14/3330-C-10
pH	P1	pH units	7.2	7.7	8.0	8.0	7.6
Conductivity	P2	μScm^{-1}	3,340	30,732	29,257	26,966	26,936
DO (membrane electrode)	P12	mg/L	2.3	7.9	10	10	12
*Redox Potential	P16	mV	+100	-----	-----	-----	-----
Alkalinity as $CaCO_3$	C10	mg/L	400	-----	-----	-----	-----
Bicarbonate HCO_3	C10	mg/L	243	-----	-----	-----	-----
Turbidity	P8	NTU	-----	9.9	11	33	33
Suspended Solids	P4	mg/L	-----	35	33	37	44
Oil and Grease	C8	mg/L	-----	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	-----	0.03	0.05	0.08	0.07
Total-N	C55	mg/L	-----	0.36	0.86	1.52	1.38
Chloride	C20	mg/L	780	-----	-----	-----	-----
Calcium	M8	mg/L	22	-----	-----	-----	-----
Magnesium	M8	mg/L	43	-----	-----	-----	-----
Sodium	M8	mg/L	685	-----	-----	-----	-----
Potassium M8	M8	mg/L	29	-----	-----	-----	-----
Sulphur as Sulphate	M8	mg/L	211	-----	-----	-----	-----
Aluminium (Total)	M8	mg/L	0.34	-----	-----	-----	-----
Arsenic (Total)	M7	mg/L	<0.005	-----	-----	-----	-----
Iron (Total)	M8	mg/L	1.62	-----	-----	-----	-----
Manganese (Total)	M8	mg/L	0.06	-----	-----	-----	-----

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

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(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweed.nsw.gov.au/tweedlab/

FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0219-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	22/01/2015

Taken By:	Client	**No of Samples:**	1
Date Taken:	22/01/2015	**Date Testing Commenced:**	22/01/2015
Date Received:	22/01/2015	**Date Testing Completed:**	22/01/2015

Sample Description: Dunloe Sands - Lake Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/0219-A/1	1	Lake

COMMENTS:
Results refer to samples as received at the Laboratory.
ND = Not Detected.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Sally Hinton
(Senior Technical Officer - Phycology)
shinton@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands - Lake Algae

Lims1 Report No: 15/0219-A
Date Testing Completed: 22/01/2015
Date of Report: 22/01/2015

	Algal Identification	Method Code	Units	Count
LIMS NO. 15/0219-A/1				
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	37,000

Tweed Laboratory Centre

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Client: Ramtech Pty Ltd
Address: 30-32 Lundberg Drive
MURWILLUMBAH
NSW 2484

Lims1 Report No: 15/0219-C
Attention: Steve Peterson
Client Reference: PLUS HARD COPY
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Date of Report: 04/02/2015

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Taken By:	Client	**No of Samples:**	6
Date Taken:	22/01/2015	**Date Testing Commenced:**	22/01/2015
Date Received:	22/01/2015	**Date Testing Completed:**	04/02/2015

Sample Description: Dunloe Sands Monthly Lake & DLP

Sample/Site Identification	Sample/Site Description
1	Lake
2	DLP 1
3	DLP 3
4	DLP 5
5	DLP 6
6	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.

NATA TECHNICAL COMPETENCE

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Accreditation No: 12754 & 13538

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TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0219-C
Date Testing Completed: 04/02/2015
Date of Report: 04/02/2015

Sample Description: Dunloe Sands Monthly Lake & DLP

Sample Identification:			Lake	DLP1	DLP3	DLP5	DLP6
Date Taken:			22/01/2015	22/01/2015	22/01/2015	22/01/2015	22/01/2015
Date Received:			22/01/2015	22/01/2015	22/01/2015	22/01/2015	22/01/2015
Date Testing Commenced:			22/01/2015	22/01/2015	22/01/2015	22/01/2015	22/01/2015
Test	Method	Units	15/0219-C-1	15/0219-C-2	15/0219-C-3	15/0219-C-4	15/0219-C-5
pH	P1	pH units	4.4	4.8	6.1	5.0	4.1
Conductivity	P2	μScm^{-1}	1,029	80	7,473	811	1,216
DO (membrane electrode)	P12	mg/L	7.4	3.8	2.2	3.8	3.4
*Redox Potential	P16	mV	+204	+110	+136	+160	+230
Turbidity	P8	NTU	78	-----	-----	-----	-----
Suspended Solids	P4	mg/L	96	-----	-----	-----	-----
Oil and Grease	C8	mg/L	<2	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	0.05	-----	-----	-----	-----
Total-N	C55	mg/L	0.32	-----	-----	-----	-----

Sample Identification:			DLP7
Date Taken:			22/01/2015
Date Received:			22/01/2015
Date Testing Commenced:			22/01/2015
Test	Method	Units	15/0219-C-6
pH	P1	pH units	7.1
Conductivity	P2	μScm^{-1}	3,404
DO (membrane electrode)	P12	mg/L	2.6
*Redox Potential	P16	mV	+77
Turbidity	P8	NTU	-----
Suspended Solids	P4	mg/L	-----
Oil and Grease	C8	mg/L	-----
Total Phosphorus-P	C17	mg/L	-----
Total-N	C55	mg/L	-----

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0529-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	26/02/2015

Taken By:	Client	**No of Samples:**	1
Date Taken:	25/02/2015	**Date Testing Commenced:**	26/02/2015
Date Received:	26/02/2015	**Date Testing Completed:**	26/02/2015

Sample Description: Dunloe Sands Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/0529-A/1	1	Lake

COMMENTS:
Results refer to samples as received at the Laboratory.

NATA ACCREDITED TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Paul J Wright
(Laboratory Coordinator)
paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake - Algae

Lims1 Report No: 15/0529-A
Date Testing Completed: 26/02/2015
Date of Report: 26/02/2015

		Algal Identification	Method Code	Units	Count
LIMS NO.	**15/0529-A/1**				
		Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0529-C
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	10/03/2015

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Taken By:	Client	**No of Samples:**	6
Date Taken:	25/02/2015	**Date Testing Commenced:**	26/02/2015
Date Received:	26/02/2015	**Date Testing Completed:**	10/03/2015

Sample Description: Dunloe Sands Monthly Lake & DLP

Sample/Site Identification	Sample/Site Description
1	Lake
2	DLP 1
3	DLP 3
4	DLP 5
5	DLP 6
6	DLP 7

COMMENTS:

NATA TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Paul J Wright
(Laboratory Coordinator)
paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0529-C
Date Testing Completed: 10/03/2015
Date of Report: 10/03/2015

Sample Description: Dunloe Sands Monthly Lake & DLP

Sample Identification:			Lake	DLP1	DLP3	DLP5	DLP6
Date Taken:			25/02/2015	25/02/2015	25/02/2015	25/02/2015	25/02/2015
Date Received:			26/02/2015	26/02/2015	26/02/2015	26/02/2015	26/02/2015
Date Testing Commenced:			26/02/2015	26/02/2015	26/02/2015	26/02/2015	26/02/2015
Test	Method	Units	15/0529-C-1	15/0529-C-2	15/0529-C-3	15/0529-C-4	15/0529-C-5
pH	P1	pH units	4.2	4.2	6.4	4.0	3.7
Conductivity	P2	μScm^{-1}	960	110	7,478	433	951
DO (membrane electrode)	P12	mg/L	7.0	1.1	3.2	6.2	1.6
*Redox Potential	P16	mV	-----	160	150	178	213
Turbidity	P8	NTU	85	-----	-----	-----	-----
Suspended Solids	P4	mg/L	89	-----	-----	-----	-----
Oil and Grease	C8	mg/L	<2	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	0.08	-----	-----	-----	-----
Total-N	C55	mg/L	0.60	-----	-----	-----	-----

Sample Identification:			DLP7
Date Taken:			25/02/2015
Date Received:			26/02/2015
Date Testing Commenced:			26/02/2015
Test	Method	Units	15/0529-C-6
pH	P1	pH units	7.4
Conductivity	P2	μScm^{-1}	3,396
DO (membrane electrode)	P12	mg/L	4.5
*Redox Potential	P16	mV	30
Turbidity	P8	NTU	-----
Suspended Solids	P4	mg/L	-----
Oil and Grease	C8	mg/L	-----
Total Phosphorus-P	C17	mg/L	-----
Total-N	C55	mg/L	-----

Tweed Laboratory Centre

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www.tweed.nsw.gov.au/tweedlab/

FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0766-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	27/03/2015

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Taken By:	Client	**No of Samples:**	1
Date Taken:	26/03/2015	**Date Testing Commenced:**	26/03/2015
Date Received:	26/03/2015	**Date Testing Completed:**	27/03/2015

Sample Description: Dunloe Sands Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/0766-A/1	1	Lake

COMMENTS:
Results refer to samples as received at the Laboratory.
ND = Not Detected.

NATA TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Sally Hinton
(Senior Technical Officer - Phycology)
shinton@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake - Algae

Lims1 Report No: 15/0766-A
Date Testing Completed: 27/03/2015
Date of Report: 27/03/2015

	Algal Identification	Method Code	Units	Count
LIMS NO. 15/0766-A/1				
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	8,750

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0766-C
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
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Taken By:	Client	**No of Samples:**	14
Date Taken:	26/03/2015	**Date Testing Commenced:**	26/03/2015
Date Received:	26/03/2015	**Date Testing Completed:**	08/04/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample/Site Identification	Sample/Site Description
1	Lake 1
2	DLP 1
3	DLP 3
4	DLP 5
5	DLP 6
6	DLP 7
7	SW 3
8	SW 4
9	SW 9
10	SW 10
11	Lake 2
12	Lake 3
13	Lake 4
14	Lake 5

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Paul J Wright
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paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0766-C
Date Testing Completed: 08/04/2015
Date of Report: 08/04/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

COMMENTS:

Results refer to samples as received at the Laboratory.

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0766-C
Date Testing Completed: 08/04/2015
Date of Report: 08/04/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			Lake 1	DLP1	DLP3	DLP5	DLP6
Date Taken:			26/03/2015	26/03/2015	26/03/2015	26/03/2015	26/03/2015
Date Received:			26/03/2015	26/03/2015	26/03/2015	26/03/2015	26/03/2015
Date Testing Commenced:			26/03/2015	26/03/2015	26/03/2015	26/03/2015	26/03/2015
Test	Method	Units	15/0766-C-1	15/0766-C-2	15/0766-C-3	15/0766-C-4	15/0766-C-5
pH	P1	pH units	4.1	4.0	6.1	4.8	4.2
Conductivity	P2	μScm^{-1}	853	409	7,542	1,066	1,600
DO (membrane electrode)	P12	mg/L	7.5	4.0	2.9	3.9	5.1
*Redox Potential	P16	mV	-----	+245	+195	+144	+177
Alkalinity as $CaCO_3$	C10	mg/L	NP	NP	130	2	NP
Bicarbonate HCO_3	C10	mg/L	NP	NP	128	2	NP
Turbidity	P8	NTU	34	-----	-----	-----	-----
Suspended Solids	P4	mg/L	55	-----	-----	-----	-----
Oil and Grease	C8	mg/L	<2	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	0.25	-----	-----	-----	-----
Total-N	C55	mg/L	0.42	-----	-----	-----	-----
Chloride	C20	mg/L	38	26	2,360	300	<3
Calcium	M8	mg/L	92	30	72	7.6	94
Magnesium	M8	mg/L	12	4.1	108	18	22
Sodium	M8	mg/L	22	14	1,200	142	19
Potassium	M8	mg/L	6	<5	46	<5	8
Sulfur as Sulfate	M8	mg/L	369	128	178	25	892
Aluminium (Total)	M16	mg/L	24.2	8.89	0.13	0.45	57.1
Arsenic (Total)	M16	mg/L	0.003	0.002	<0.001	<0.001	0.017
Iron (Total)	M16	mg/L	5.61	5.14	3.66	17.7	265
Manganese (Total)	M16	mg/L	1.03	0.351	0.681	0.130	2.31

TWEED SHIRE COUNCIL

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Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0766-C
Date Testing Completed: 08/04/2015
Date of Report: 08/04/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			DLP7	SW 3	SW 4	SW 9	SW 10
Date Taken:			26/03/2015	25/03/2015	25/03/2015	25/03/2015	26/03/2015
Date Received:			26/03/2015	26/03/2015	26/03/2015	26/03/2015	26/03/2015
Date Testing Commenced:			26/03/2015	26/03/2015	26/03/2015	26/03/2015	26/03/2015
Test	Method	Units	15/0766-C-6	15/0766-C-7	15/0766-C-8	15/0766-C-9	15/0766-C-10
pH	P1	pH units	7.1	3.7	3.7	4.2	4.2
Conductivity	P2	μScm^{-1}	3,446	1,834	1,426	763	779
DO (membrane electrode)	P12	mg/L	3.1	4.8	4.7	5.2	5.6
*Redox Potential	P16	mV	+78	-----	-----	-----	-----
Alkalinity as $CaCO_3$	C10	mg/L	420	-----	-----	-----	-----
Bicarbonate HCO_3	C10	mg/L	423	-----	-----	-----	-----
Turbidity	P8	NTU	-----	54	48	16	14
Suspended Solids	P4	mg/L	-----	23	24	5.8	8.0
Oil and Grease	C8	mg/L	-----	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	-----	0.04	0.1	0.02	0.06
Total-N	C55	mg/L	-----	1.32	1.15	1.04	1.08
Chloride	C20	mg/L	780	-----	-----	-----	-----
Calcium	M8	mg/L	18	-----	-----	-----	-----
Magnesium	M8	mg/L	38	-----	-----	-----	-----
Sodium	M8	mg/L	651	-----	-----	-----	-----
Potassium	M8	mg/L	26	-----	-----	-----	-----
Sulfur as Sulfate	M8	mg/L	250	-----	-----	-----	-----
Aluminium (Total)	M16	mg/L	0.51	-----	-----	-----	-----
Arsenic (Total)	M16	mg/L	<0.001	-----	-----	-----	-----
Iron (Total)	M16	mg/L	2.62	-----	-----	-----	-----
Manganese (Total)	M16	mg/L	0.077	-----	-----	-----	-----

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0766-C
Date Testing Completed: 08/04/2015
Date of Report: 08/04/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			Lake 2	Lake 3	Lake 4	Lake 5
Date Taken:			26/03/2015	26/03/2015	26/03/2015	26/03/2015
Date Received:			26/03/2015	26/03/2015	26/03/2015	26/03/2015
Date Testing Commenced:			26/03/2015	26/03/2015	26/03/2015	26/03/2015
Test	Method	Units	15/0766-C-11	15/0766-C-12	15/0766-C-13	15/0766-C-14
pH	P1	pH units	4.0	4.0	4.0	4.0
Conductivity	P2	μScm^{-1}	859	859	860	864
DO (membrane electrode)	P12	mg/L	7.6	7.5	7.5	7.5
*Redox Potential	P16	mV	+280	+297	+312	+316
Alkalinity as $CaCO_3$	C10	mg/L	-----	-----	-----	-----
Bicarbonate HCO_3	C10	mg/L	-----	-----	-----	-----
Turbidity	P8	NTU	-----	-----	-----	-----
Suspended Solids	P4	mg/L	-----	-----	-----	-----
Oil and Grease	C8	mg/L	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	-----	-----	-----	-----
Total-N	C55	mg/L	-----	-----	-----	-----
Chloride	C20	mg/L	-----	-----	-----	-----
Calcium	M8	mg/L	-----	-----	-----	-----
Magnesium	M8	mg/L	-----	-----	-----	-----
Sodium	M8	mg/L	-----	-----	-----	-----
Potassium	M8	mg/L	-----	-----	-----	-----
Sulfur as Sulfate	M8	mg/L	-----	-----	-----	-----
Aluminium (Total)	M16	mg/L	-----	-----	-----	-----
Arsenic (Total)	M16	mg/L	-----	-----	-----	-----
Iron (Total)	M16	mg/L	-----	-----	-----	-----
Manganese (Total)	M16	mg/L	-----	-----	-----	-----

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0989-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	27/04/2015

Taken By:	Client	**No of Samples:**	1
Date Taken:	24/04/2015	**Date Testing Commenced:**	24/04/2015
Date Received:	24/04/2015	**Date Testing Completed:**	27/04/2015

Sample Description: Dunloe Sands Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/0989-A/1	1	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.
ND = Not Detected.

NATA TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Paul J Wright
(Laboratory Coordinator)
paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake - Algae

Lims1 Report No: 15/0989-A
Date Testing Completed: 27/04/2015
Date of Report: 27/04/2015

	Algal Identification	Method Code	Units	Count
LIMS NO. 15/0989-A/1				
	Total Cyanophyta	B9	cells/mL	ND
	Total Cyanophyta Biovolume	B20	mm^3/L	ND
	Chlorophyta	B9	cells/mL	8000

Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/0989-C
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	08/05/2015

Taken By:	Client	**No of Samples:**	10
Date Taken:	24/04/2015	**Date Testing Commenced:**	24/04/2015
Date Received:	24/04/2105	**Date Testing Completed:**	08/05/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample/Site Identification	Sample/Site Description
1	Lake
2	DLP 1
3	DLP 3
4	DLP 5
5	DLP 6
6	DLP 7
7	SW 3
8	SW 4
9	SW 9
10	SW 10

COMMENTS:

NATA ACCREDITED FOR TECHNICAL COMPETENCE

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Accreditation No: 12754 & 13538

Dr Paul J Wright
(Laboratory Coordinator)
paulw@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/0989-C
Date Testing Completed: 08/05/2015
Date of Report: 08/05/2015

Sample Description: Dunloe Sands Qtly Lake, SW & DLP

Sample Identification:			Lake	DLP1	DLP3	DLP5	DLP6
Date Taken:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Date Received:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Date Testing Commenced:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Test	Method	Units	15/0989-C-1	15/0989-C-2	15/0989-C-3	15/0989-C-4	15/0989-C-5
pH	P1	pH units	4.3	4.1	6.6	3.7	4.0
Conductivity	P2	μScm^{-1}	963	131	7,540	963	1,558
DO (membrane electrode)	P12	mg/L	8.5	2.7	4.8	4.8	2.5
*Redox Potential	P16	mV	-----	+253	+246	+257	+226
Turbidity	P8	NTU	59	-----	-----	-----	-----
Suspended Solids	P4	mg/L	95	-----	-----	-----	-----
Oil and Grease	C8	mg/L	<2	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	0.1	-----	-----	-----	-----
Total-N	C55	mg/L	0.73	-----	-----	-----	-----

Sample Identification:			DLP7	SW 3	SW 4	SW 9	SW 10
Date Taken:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Date Received:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Date Testing Commenced:			24/04/2015	24/04/2015	24/04/2015	24/04/2015	24/04/2015
Test	Method	Units	15/0989-C-6	15/0989-C-7	15/0989-C-8	15/0989-C-9	15/0989-C-10
pH	P1	pH units	7.5	6.5	6.4	6.2	6.2
Conductivity	P2	μScm^{-1}	3,438	12,467	12,416	4,344	4,381
DO (membrane electrode)	P12	mg/L	5.5	7.2	7.4	6.8	6.5
*Redox Potential	P16	mV	+53	-----	-----	-----	-----
Turbidity	P8	NTU	-----	7.8	22	29	25
Suspended Solids	P4	mg/L	-----	4.0	18	14	15
Oil and Grease	C8	mg/L	-----	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	-----	0.15	0.02	0.03	0.03
Total-N	C55	mg/L	-----	0.46	0.45	0.86	0.87

Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/1271-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	29/05/2015

Taken By:	Client	**No of Samples:**	1
Date Taken:	29/05/2015	**Date Testing Commenced:**	29/05/2015
Date Received:	29/05/2015	**Date Testing Completed:**	29/05/2015

Sample Description: Dunloe Sands Lake Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/1271-A/1	1	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.
ND = Not Detected.

NATA TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Dr Sally Hinton
(Senior Technical Officer - Phycology)
shinton@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Algae

Lims1 Report No: 15/1271-A
Date Testing Completed: 29/05/2015
Date of Report: 29/05/2015

	Algal Identification	Method Code	Units	Count
LIMS NO. 15/1271-A/1				
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	76,000
	Diatoms (Bacillariophyta)	B9	cells/mL	4,200

Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/1271-C
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	17/06/2015

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Taken By:	Client	**No of Samples:**	6
Date Taken:	28/05/2015	**Date Testing Commenced:**	29/05/2015
Date Received:	29/05/2015	**Date Testing Completed:**	17/06/2015

Sample Description: Dunloe Sands DLP & Lake Water Samples - Chemical

Sample/Site Identification	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7
6	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.

NATA TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538

Darryl Capner
(Senior Technical Officer – Chemistry)
dcapner@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 30-32 Lundberg Drive

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 15/1271-C
Date Testing Completed: 17/06/2015
Date of Report: 17/06/2015

Sample Description: Dunloe Sands DLP & Lake Water Samples - Chemical

Sample Identification:			DLP1	DLP3	DLP5	DLP6	DLP7
Date Taken:			28/05/2015	28/05/2015	28/05/2015	28/05/2015	28/05/2015
Date Received:			29/05/2015	29/05/2015	29/05/2015	29/05/2015	29/05/2015
Date Testing Commenced:			29/05/2015	29/05/2015	29/05/2015	29/05/2015	29/05/2015
Test	Method	Units	15/1271-C-1	15/1271-C-2	15/1271-C-3	15/1271-C-4	15/1271-C-5
pH	P1	pH units	3.8	6.5	3.8	3.9	7.5
Conductivity	P2	μScm^{-1}	164	7,483	611	2,153	3,417
DO (membrane electrode)	P12	mg/L	2.0	5.2	2.5	5.3	6.0
*Redox Potential	P16	mV	+256	+182	+325	+279	+161
Turbidity	P8	NTU	-----	-----	-----	-----	-----
Suspended Solids	P4	mg/L	-----	-----	-----	-----	-----
Oil and Grease	C8	mg/L	-----	-----	-----	-----	-----
Total-N	C55	mg/L	-----	-----	-----	-----	-----
Total Phosphorus-P	C17	mg/L	-----	-----	-----	-----	-----

Sample Identification:			Lake
Date Taken:			28/05/2015
Date Received:			29/05/2015
Date Testing Commenced:			29/05/2015
Test	Method	Units	15/1271-C-6
pH	P1	pH units	4.4
Conductivity	P2	μScm^{-1}	927
DO (membrane electrode)	P12	mg/L	9.0
*Redox Potential	P16	mV	-----
Turbidity	P8	NTU	52
Suspended Solids	P4	mg/L	85
Oil and Grease	C8	mg/L	<2
Total-N	C55	mg/L	0.44
Total Phosphorus-P	C17	mg/L	0.22

Tweed Laboratory Centre

TWEED SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samplereception@tweed.nsw.gov.au ABN: 90 178 732 496
(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweed.nsw.gov.au/tweedlab/

FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd		
Address:	30-32 Lundberg Drive MURWILLUMBAH **NSW 2484**		
		Lims1 Report No:	15/1484-A
Attention:	Steve Peterson	**Client Reference:**	PLUS HARD COPY
Copy To:	Fax: 02 6672 3896 & Adam Smith	**Date of Report:**	01/07/2015

Taken By:	Client	**No of Samples:**	1
Date Taken:	29/06/2015	**Date Testing Commenced:**	29/06/2015
Date Received:	29/06/2015	**Date Testing Completed:**	01/07/2015

Sample Description: Dunloe Sands Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
15/1484-A/1	1	Lake

COMMENTS:
Results refer to samples as received at the Laboratory.
ND = Not Detected.

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13638

Dr Sally Hinton
(Senior Technical Officer - Phycology)
shinton@tweed.nsw.gov.au

TWEED SHIRE COUNCIL

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake - Algae

Lims1 Report No: 15/1484-A
Date Testing Completed: 01/07/2015
Date of Report: 01/07/2015

	Algal Identification	Method Code	Units	Count
LIMS NO. 15/1484-A/1				
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	211,000
	Diatoms (Bacillariophyta)	B9	cells/mL	6,300

Appendix D
Regeneration Sheets

19/1/16

Area 1A - stage 1

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? No.

Is there evidence of rubbish dumping within the rehabilitation zones? No.

Is there evidence of plant theft within the rehabilitation zone? NO.

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO.

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 5-7m
- Shrub species 1-2m
- ground covers <1m

What are the dominant species within each layer?

- Tree Casuarina glauca, Melaleuca quinquenervia
- Shrub banksias
- ground covers rushes, sedges, grass species

Have you noticed any new native plant species since the last monthly inspection? no.

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NIL
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) welcome
Glossy Black Cockatoos NO.
Other NO.

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit?

NO.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- (Good)
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? No
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? No
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry – Area 1A – Stage 1		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: revegetation shows positive growth & establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... or ~~NO~~ ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

19/1/16

Area 1A - Stage 2

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? minor grass intrusion (setaria)

What species? Setaria

What management was undertaken to eradicate these weeds? Spot-spraying

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. yes.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~6-8m
- Shrub species 1-2m
- ground covers <1m

What are the dominant species within each layer?

- Tree Casuarina glauca, melaleuca
- Shrub Banksia,
- ground covers Sedges, rushes & grass species

Have you noticed any new native plant species since the last monthly inspection? NO.

If yes name the species or take a photograph N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones yes.

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey Osprey overhead.
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) no
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) fairy wren
Glossy Black Cockatoos NO.
Other NO.

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO.

What actions were undertaken to remove any illegal modifications? N/A.

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Park Sand Quarry - Area 1A - stage 2		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: revegetation shows positive growth & establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... *or* NO ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

19/1/16

Area 1A - stage 3

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? Minor - grass intrusion

What species? Setaria & Digitaria

What management was undertaken to eradicate these weeds? Spot-spraying

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. yes.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 6-8m
- Shrub species 1-2m
- ground covers <1m

What are the dominant species within each layer?

- Tree Casuarina glauca, Melaleuca quin
- Shrub Banksia, cheese tree
- canopy sp. regrowth
- ground covers grass species, rushes & Sedges

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones yes.

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala No
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) No
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO.

What actions were undertaken to remove any illegal modifications? N/A.

Condition of fences

- (Good)
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO.
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry - Area 1A - Stage 3		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/11/16	
Overall comments on site condition: revegetation shows positive growth + establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

19/1/16

Area 1B - Stage 1

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? yes

What species? 1 x Camphor Laurel sapling.

What management was undertaken to eradicate these weeds? pulled out

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. yes.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~ 6-8 m
- Shrub species 1-2 m
- ground covers <1 m

What are the dominant species within each layer?

- Tree Casuarina, she-oak, eucalypt + melaleuca quinq
- Shrub Canopy regrowth + tuckered
- ground covers Sedges, rushes, grass sp, bracken

Have you noticed any new native plant species since the last monthly inspection? NO.

If yes name the species or take a photograph NO.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

yes.

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala No.
Kangaroo/wallaby NO.
Possums/gliders NO.
Small mammal (i.e. bandicoot, echidna) NO.
Reptiles (i.e.snakes/lizards) NO.
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other NO.

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit?

NO.

What actions were undertaken to remove any illegal modifications?

N/A.

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? 1x camphor Laurel
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry – Area 1B - Stage 1		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: revegetation demonstrates positive growth & establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... or NO .... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1B - stage 2

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO.

What species? N/A.

What management was undertaken to eradicate these weeds? N/A.

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~ 6-8m
- Shrub species ~ 1-2 m
- ground covers < 1M

What are the dominant species within each layer?

- Tree glauca, she-oak, eucalypt sp, Melaleuca quin.
- Shrub fuchsia bush, banksia
- ground covers bracken + lomandra + grasses

Have you noticed any new native plant species since the last monthly inspection? NO.

If yes name the species or take a photograph N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) Rainbow lorikeets
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) wrens
Glossy Black Cockatoos NO.
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit?

NO.

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry - Area 1B - stage 2		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Revegetation shows positive growth & establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

19/1/16

Area 1B - stage 3

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? minor grass intrusion

What species? Setaria

What management was undertaken to eradicate these weeds? Spot-spray

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. YES

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 5-6m
- Shrub species ~1-2m
- ground covers <1m

What are the dominant species within each layer?

- Tree glauca, she-oak, eucalypts + Melaleuca
- Shrub Banksia
- ground covers bracken, lomandra + grass species

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A.

Acknowledge that the required routine photographs have been taken within the rehabilitation zones yes.

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) wrens
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** –
Site name: Dunloe Sand Quarry - Area 1B - Stage 3		**Site ID:** –
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Kados	**Date of current assessment:** 19/11/16	
Overall comments on site condition: Revegetation shows positive growth + establishment of native species		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1B - Stage 4

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? yes

What species? Coastal morning glory

What management was undertaken to eradicate these weeds? cut + Sprayed

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. YES

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 6-8m
- Shrub species 2-3m
- ground covers <1m

What are the dominant species within each layer?

- Tree glauca, Melaleuca, eucalypt sp.
- Shrub Banksias + Xanthorrhoea
- ground covers grass species, Lomandra + Brachyscome

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph NO

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit?

NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** –
Site name: Dunloe Sand Quarry - Area 1B - Stage 4		**Site ID:** –
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Revegetation demonstrates positive growth + establishment of native species		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1B - stage 5

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? minor exotic grass intrusion

What species? setaria

What management was undertaken to eradicate these weeds? spot-spraying

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. yes.

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~ 6-8
- Shrub species ~ 2-3 m
- ground covers ~ <1m

What are the dominant species within each layer?

- Tree glauca + melaleucas
- Shrub Banksia
- ground covers sedges, lomandra grasses

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) water dragon
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other Pheasant Cancel

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? NO

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand [redacted] Project		**Project ID:** –
Site name: Dunloe Sand Quarry - Area 1B - Stage 5		**Site ID:** –
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Revegetation demonstrates positive growth + establishment of native species		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1C - stage 1

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~5-7m
- Shrub species ~2-4m
- ground covers <50cm

What are the dominant species within each layer?

- Tree Casuarina glauca
- Shrub Banksia
- ground covers saltmarsh, juncus, mangrove fern

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones YES

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) water dragon
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) Magpies
Glossy Black Cockatoos NO.
Other Grab holes

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an **'X'** next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** ~
Site name: Dunloe Sand Quarry - Area 1C - Stage 1		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Kadas	**Date of current assessment:** 19/11/16	
Overall comments on site condition: Site demonstrates a positive increase in native species growth & establishment		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1C - stage 2

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~6-8m
- Shrub species ~2-4m
- ground covers <50cm

What are the dominant species within each layer?

- Tree Glaucas
- Shrub Banksias
- ground covers Saltmarsh, Juncus, Sedges

Have you noticed any new native plant species since the last monthly inspection? No

If yes name the species or take a photograph No

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

Yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) wren
Glossy Black Cockatoos NO
Other Crab holes

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry - Area 1C - stage 2		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Site demonstrates a positive increase in native species growth & establishment		
Has the condition of the site changed since last assessment? YES ..... *or* NO ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 1C - Stage 3

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? No

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species ~6-8m
- Shrub species ~2-4m
- ground covers < 50cm

What are the dominant species within each layer?

- Tree Casuarina glauca
- Shrub Banksia
- ground covers Saltmarsh + Sedges + Juncus

Have you noticed any new native plant species since the last monthly inspection? No

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO.
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) water dragon
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) wrens
Glossy Black Cockatoos NO.
Other Crab holes

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit?

No

What actions were undertaken to remove any illegal modifications?

N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** —
Site name: Dunloe Sand Quarry – Area 1C – stage 3		**Site ID:** —
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rudas	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Site shows positive growth + establishment of native species.		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 24 - Stage 3

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species - 5-8m
- Shrub species - 2-4m
- ground covers - <1m

What are the dominant species within each layer?

- Tree Casuarina glauca, Melaleuca quin.
- Shrub Banksia
- ground covers sedges, grass spp. Common Reed

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones YES

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an **'X'** next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** –
Site name: Dunloe Sand Quarry - Area 2A - Stage 3		**Site ID:** –
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rados	**Date of current assessment:** 19/1/16	
Overall comments on site condition: Site demonstrates a positive increase in growth & establishment		
Has the condition of the site changed since last assessment? YES ..... or (NO) ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = **OK** on track towards target									(should be routine: describe if necessary)
B = **Uncertain**									
significant problems									(describe)
C = **Poor** major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 2B - Stage 1

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A.

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? NO

What species? N/A

What management was undertaken to eradicate these weeds? N/A

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. N/A

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 1-2m
- Shrub species <1m
- ground covers <1m

What are the dominant species within each layer?

- Tree Casuarina Glauca
- Shrub Common Reed, Sedges as above
- ground covers as above

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph N/A

Acknowledge that the required routine photographs have been taken within the rehabilitation zones

yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey NO
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) NO
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NO

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- Good
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? NO
Extent of other Weeds? NO
Survival Rate of Plants? NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand ~~Quarry~~ Project		**Project ID:** –
Site name: Dunloe Sand Quarry – ~~Stage 2B~~, Area 2B - Stage 1		**Site ID:** –
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Rado	**Date of current assessment:** 19/1/16	
Overall comments on site condition: site demonstrates positive increase in native species growth + establishment		
Has the condition of the site changed since last assessment? YES ..... *or* NO ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

Area 2C - Stage 1

FORM A: ROUTINE QUARTERLY REHABILITATION MONITORING SHEET

General Management

Has there been a fire within the last quarter? NO

Do the bushfire trails or adjacent pasture areas require slashing or maintenance to reduce fire risk? NO

Is there evidence of rubbish dumping within the rehabilitation zones? NO

Is there evidence of plant theft within the rehabilitation zone? NO

Does it appear that the rehabilitation zone has been utilized for stockpiling, vehicle parking, building waste dumping, cattle grazing or person traffic? NO

If yes, acknowledge below what works were undertaken to rectify/restore and the date N/A

Weeds

Have any areas of weeds re-established within the rehabilitation zones during the last quarter? Camphor Laurel + devil's fig sapling

What species? as above

What management was undertaken to eradicate these weeds? pulled out

If management was undertaken acknowledge that such was performed in accordance with the approved rehabilitation management plan. yes

Vegetation regeneration

Natural regeneration is occurring in (record height range estimate):

- Tree species 5 6-8m
- Shrub species 5 2-4m
- ground covers 4 m

What are the dominant species within each layer?

- Tree Banksia + Casuarina glauca, eucalypt spp
- Shrub
- ground covers grass, Species bracke~

Have you noticed any new native plant species since the last monthly inspection? NO

If yes name the species or take a photograph NO

Acknowledge that the required routine photographs have been taken within the rehabilitation zones yes

Biodiversity

Have you spotted native fauna within the rehabilitation zone during inspection?

If yes, what types?

Koala NO
Kangaroo/wallaby NO
Possums/gliders NO
Small mammal (i.e. bandicoot, echidna) NO
Reptiles (i.e.snakes/lizards) NO
Birds of prey Osprey overhead
Large nectar feeding birds (i.e. lorikeets, parrots, cockatoos) NO
Small tree and ground birds (i.e. finches, fairy wrens, treecreepers) wrens
Glossy Black Cockatoos NO
Other NO

Modifications

Have there been any structural additions (eg. new tracks, buildings) to the rehabilitation zones since the last visit? NA

What actions were undertaken to remove any illegal modifications? N/A

Condition of fences

- ~~Good~~
- Need minor repair
- Poor (need replacement)

Are any of the following performance criteria exceeded (refer Section 4.5 below)?

Declared Weeds? yes
Extent of other Weeds? NO
Survival Rate of Plants? ~~yes~~ NO
Condition of Plants? NO
Canopy Coverage? NO
Tree, Small Tree & Shrub Diversity? NO
Groundcover Coverage? NO
General Coverage/Success? NO

If yes, what corrective action was performed (i.e. plant showed drought stress and so watering was undertaken, plant was dead so a replacement plant was pocket planted, canopy plant coverage was not achieved so relevant pioneer plants were pocket planted).

PROFORMA FOR ASSESSING SITE CONDITION

PROJECT DESCRIPTION *Note: where options are given, put an 'X' next to the appropriate term(s):*

Project name: Dunloe Park Sand Project		**Project ID:** -
Site name: Dunloe Sand Quarry - Area 2C - stage 1		**Site ID:** -
Type of on-grounds: Assisted Natural Regeneration	**Years since site commenced:** 6	**When was this site last assessed?**
Current assessment conducted by: Tony Radus	**Date of current assessment:** 19/1/16	
Overall comments on site condition: The revegetation demonstrates an uptake + success for both species diversity + vigours + establishment of species on site.		
Has the condition of the site changed since last assessment? YES ..... *or* NO ..... *If Yes, briefly describe changes in this box, and provide details in table below.*		

DETAILED DESCRIPTION OF SITE CONDITION *Complete table quarterly, or if conditions have changed since last assessment. Also draw map.*

Rating/ zone	Area (ha)	% of site	Location and factors affecting outcomes	Canopy cover (%)	Ground cover	Problem weeds	Tree survival or Recruitment	Other comments	Suggested maintenance
A = OK on track towards target									(should be routine: describe if necessary)
B = Uncertain									
significant problems									(describe)
C = Poor major problems, likely to fail									(describe)
Overall Condition Score (ranges from 0-100%) *Multiply percentage of site occupied by each zone (A, B or C), by the condition rating for each zone (A = 1; B = 0.5; C = 0), and add the products: e.g. (70% x 1) + (20% x 0.5) + (10% x 0) = 80%*									..... %

PROFORMA FOR MONITORING FOREST STRUCTURE

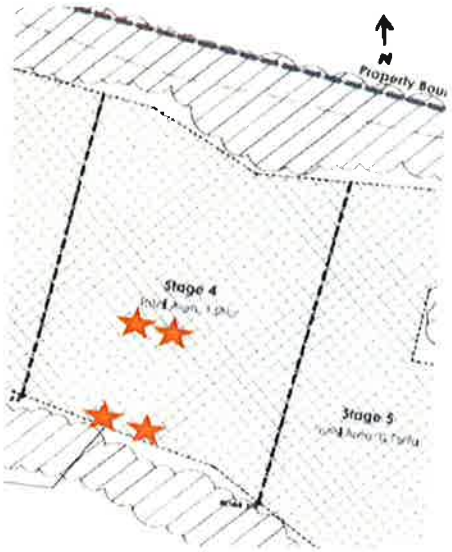
Project name:	Dunloe Park Sand Project	**Project ID:**	—
Site name:	Dunloe Sand Quarry	**Site ID:**	—
Assessed by:	Tony Rudos	**Date:**	19/1/16

LOCATION OF MONITORING PLOTS

Provide details and also mark on the map of the site	**Plot**
Location at 0 m point of plot (grid / GPS coordinates):	28·250.75 - 153·3319.8'E
Datum:	
Compass bearing / direction of transect (from 0 m point)	S to N
Landform (e.g. plateau, crest, upper slope, mid-slope, lower slope, stream bank, floodplain)	Plain
Slope (: e.g. flat/steep)	Flat
Aspect (compass bearing / direction of fall of slope)	Flat

MAP OF MONITORING PLOTS

In the box, insert a map of the site showing the location of monitoring plots (mark 0 m point) in relation to notable features of the site (e.g. property boundaries, roads, waterways). Also show notable features of the monitoring plots (e.g. non-standard layout, presence of remnant trees) and location of any landscape photopoints. Include a scale bar (e.g. 0-100 m) and North arrow.



Site name: Dunloe sand Quarry - 1B stage 4	Date: 19/1/16

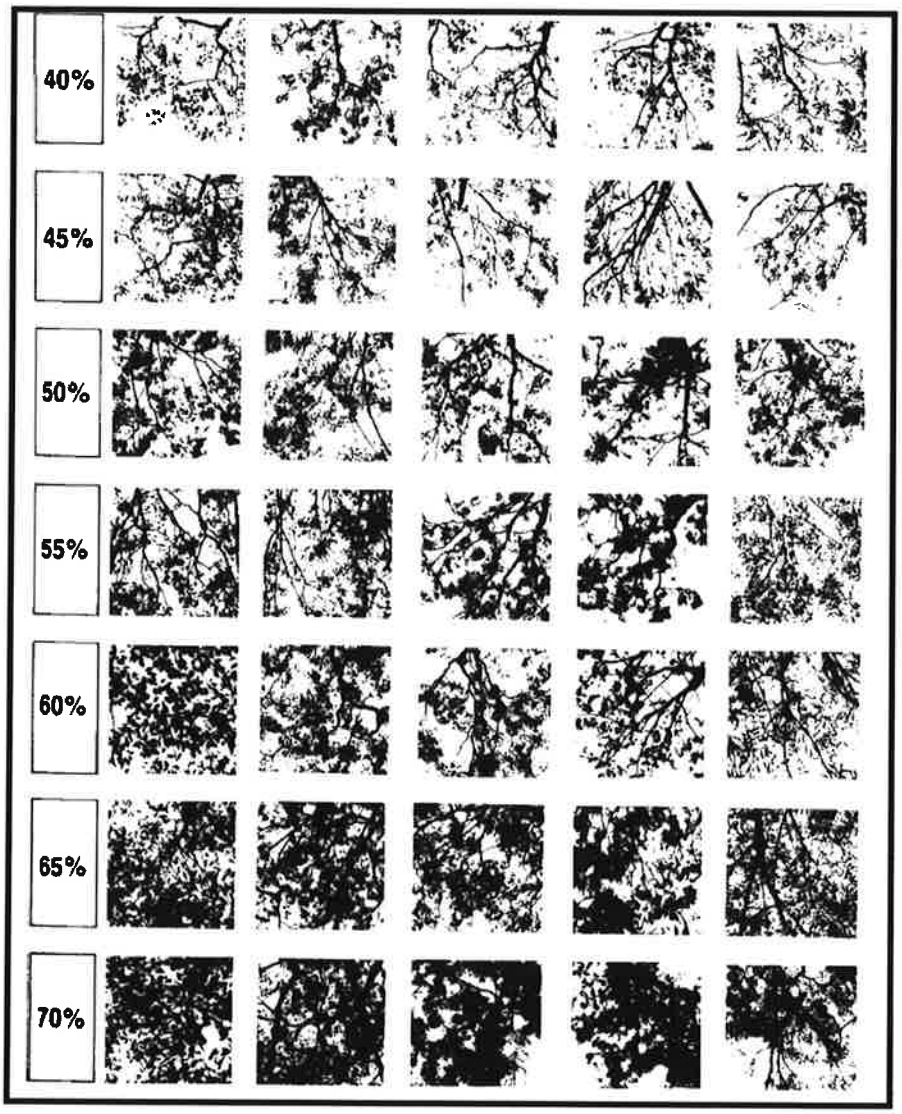
GROUND COVER, CANOPY COVER and CANOPY HEIGHT
For each survey plot, lay out a 50 m transect. Then survey quadrats centred on the 5 m, 25 m and 45 m points

Ground cover = proportion of ground covered by (a) vegetation within 1 m of ground (categorised by life form), (b) leaf litter and fine woody debris, (c) coarse woody debris, d) rock, (e) soil, or (f) other. *At the 5 m, 25 m and 45 m points, define a 1 m x 1 m quadrat, using four 1 m sticks. Looking down at the quadrat from 1 m, estimate the % of ground covered by each type (as would be seen on a photo: total must add to 100%).*

Ground Cover	**Plot**		
Location of quadrat:	**5 m**	**25 m**	**45 m**
a) **Vegetation within 1 m of the ground**			
Grass (and sedges)	50 %	40 %	30 %
Herbs (soft-stemmed plants)	10 %	10 %	10 %
Ferns	5 %	0 %	0 %
Vines and scramblers	1 %	0 %	0 %
Tree seedlings and shrubs	25 %	20 %	30 %
Moss (and liverworts and lichens)	0 %	0 %	0 %
b) **Leaf litter** and fine woody debris <10 cm diameter	4 %	10 %	5 %
c) **Coarse woody debris** >10 cm diameter	5 %	10 %	5 %
d) **Bare rock**	0 %	0 %	0 %
e) **Bare soil**	0 %	0 %	0 %
f) **Other** (including tree trunks, roots, etc.)	0 %	0 %	0 %
TOTAL (must add up to 100%)	**100%**	**100%**	**100%**

Canopy (foliage) cover = projective cover of ecologically dominant layer above ground level (shade cast by foliage and stems, if the sun was overhead, assessed (approximately) above the entire 10 m x 10 m quadrat around each point. It can be estimated by eye (although this can be very subjective) or from a photo. *1. Estimate foliage cover visually, e.g. by comparison with reference photos. 2. Take a wide-angled digital photo looking up from the centre of each 10 x 10 m quadrat, and use to calculate foliage cover). Record the number of each photo for later reference.*

Canopy (foliage) cover	**Plot**		
Location of quadrat: 1B - Stage 4	**5 m**	**25 m**	**45 m**
Visual estimate of canopy (foliage) cover	5	60	50
Canopy (foliage) cover calculated from photo	5	60	50
Record number of canopy photo for reference			



CANOPY COVER PHOTOGRAPHS PER WALKER AND HOPKINS (1990)

Canopy height The height of the tallest tree in the canopy of each 10 m x 10 m quadrat (the canopy is the layer of foliage forming the 'roof' of the forest: it may be broken by gaps or incomplete). In some sites, it may be necessary to distinguish canopy trees from emergents: i.e. trees projecting well above the canopy with crowns exposed on all sides *Note: Estimating height is difficult. Use a clinometer & tape measure, or range finder, or other measure. Alternatively, place a 2.5 m pole against a tree, & standing at a distance, estimate height in multiples of 2.5 m.*

Canopy height	**Plot**		
Location of quadrat: 1B - Stage 4	**5 m**	**25 m**	**45 m**
Canopy height (tallest trees in canopy)	8	4	6
Height of emergent trees (if present)	8	4	6

Site name:	IB stage 1	Date:	19/1/16

SPECIAL LIFE FORMS: *Record **presence** of life forms in each 10 m x 10 m quadrat centred on the 5 m, 25 m and 45 m points. If life forms are present on site, but not in quadrats, record in last column. Do not count no. of individuals.*

Special Life Forms		Plot			On site?
Location of quadrat:		5 m	25 m	45 m	
Strangler figs Figs with network of roots around stem of host tree, rooted in ground		✓	✓	✓	✓
Hemi-epiphytes Climbing plants adhering to tree trunks, rooted in ground, e.g. *Pothos*, climbing pandanus		✓	✓	✓	✓
Vines Climbing woody-stemmed plants dependent on trees for support, and rooted in the ground	**Slender** (stem <5 cm diam.)	✓	✓	✓	✓
	Robust (stem >5 cm diam.)	✓	✓	✓	✓
Vine towers Dense columns of vines growing over and smothering tree crowns and stems		✓	✓	✓	✓
Vine tangles Dense masses of interwoven vine stems in understorey or midstorey		✓	✓	✓	✓
Thorny scramblers Thicket-forming vines or shrubs, often spiny, e.g. *Calamus*, lantana, cockspur, raspberry, other vines (e.g. *Eleagnus, Maesa)*	**Individual** plants present	✓	✓	✓	✓
	Thickets present	✓	✓	✓	✓
Palm trees Palms with stems >2 m high		✓	✓	✓	✓
Understorey palms with stems <2 m high, e.g. walking stick palms (also includes juvenile palm trees)		✓	✓	✓	✓
Tree ferns Ferns with stems usually >0.5 m high		✓	✓	✓	✓
Ground ferns Ferns or fern-like plants without stems, growing on the ground		✓	✓	✓	✓
Clumping epiphytic ferns e.g. staghorns, basket ferns		✓	✓	✓	✓
Other epiphytes Growing on trees, e.g. trailing ferns, orchids, not rooted on ground		✓	✓	✓	✓
Cordylines 'Palm-lilies': shrubs to 5 m high, occasionally branched, with long leaves		✓	✓	✓	✓
Herbs with long wide leaves e.g. gingers, cunjevoi, bananas		✓	✓	✓	✓
Herbs with long strap-like leaves e.g. lilies, mat-rush		✓	✓	✓	✓
Cycads Plants with leathery palm-like foliage borne on stout stems or growing on ground (subterranean stems)	Stout stems, e.g. *Lepidozamia*	✓	✓	✓	✓
	Ground cycads, e.g. *Bowenia*	✓	✓	✓	✓
Pandanus Shrub / small tree with serrated strap-like leaves		✓	✓	✓	✓
Other life forms: describe...		–	–	–	–

Woody debris = fallen logs and branches lying on or within 1 m of the ground.

Tally the number of times logs are intercepted by the 50 m transect, by diameter class at the point of intersection. If a log is intercepted by the transect more than once, it is tallied each time, by diameter at each of the points of intersection

Tally intercepts with fallen logs by diameter class on each transect	Fine woody debris <10 cm dia		Coarse woody debris (CWD) > 10 cm diameter						
	2.5-5 cm	5-10 cm	10-20	20-30	30-40	40-50	50-75	75-100	>100
50 m transect	2	0	3	0	0	0	0	0	0

FORM D: PROFORMA FOR MONITORING FLORISTIC COMPOSITION

Project name:	**Project ID:**
Site name:	**Site ID:**
Assessed by:	**Date:**

LOCATION OF MONITORING PLOTS

Provide details and also mark on the map of the site	**Plot**
Location at 0 m point of plot (grid / GPS coordinates):	
Datum:	
Compass bearing / direction of transect (from 0 m point)	
Landform (e.g. plateau, crest, upper slope, mid-slope, lower slope, stream bank, floodplain)	
Slope (: e.g. flat/steep)	
Aspect (compass bearing / direction of fall of slope)	

MAP OF MONITORING PLOTS
In the box, insert a map of the site showing the location of monitoring plots (mark 0 m point) in relation to notable features of the site (e.g. property boundaries, roads, waterways). Also show notable features of the monitoring plots (e.g. non-standard layout, presence of remnant trees) and location of any landscape photopoints. Include a scale bar (e.g. 0-100 m) and North arrow.

refer to Form C

Site name: 18 - Stage 4	Date: 20/1/16

GENERAL COMMENTS *on the composition of vegetation at the site (e.g. dominant or notable species, variation across the site): record by strata as follows*:

Canopy/ Ecologically Dominant Layer:

- She - oak
- Casuarina glauca
- Eucalyptus regrowth
- Melaleuca quinquenervia
- Callistemon salignus

Midstorey:

- regrowth of the above species
- Banksia
- Tuckeroo

Understorey/ Ground cover:

- Grasses
- Lomandra
- Bracken

RECRUITMENT: What species are common recruits to the site? Any other comments about recruitment?

N/A

Does this site have any WEED or MAINTENANCE ISSUES that need attention?

- minor grass intrusion

Any other comments on the site? Mark an 'X' here N/A and add extra page(s) as required.