



Review and Amendments Schedule – PLANIT CONSULTING PTY LTD

Date		
Author	BL / EB / LB	November 2014
Reviewer	AS	November 2014

Amendments

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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®
November 2014

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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.

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.

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 (within a separate report);
- Ground Waters; and
- Surface Waters.

All monitoring was undertaken by Ramtech staff.

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

- Algae Level results for November 2013 to October 2014;
- Ground Water chemical results (pH, EC, DO and RP) for November 2013 to October 2014;
- Quarterly groundwater chemical results (Chloride, Calcium, Magnesium, Sodium, Potassium, Sulphate, Arsenic, Iron and Manganese);
- Quarterly Surface Water chemical results (December 2013, March, June and September 2014);
- Rainfall levels from November 2013 to October 2014; and

The Bureau of Meteorology (BOM) recorded rainfall within surrounding suburbs over the 12 month period from November 2013 to October 2014. The recorded rainfall at Byron Bay, for this period, was approximately 1,129mm.

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. As such, a letter outlining progress from the project ecologist has been included within this report (**Appendix D**).

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 shown within the correspondence attached and referred to above.



Complaints Recorded

No complaints have been registered by the proponents to date.

Enquiry was made by Mr. David Norris (member of the Community Consultative Committee) and a response has been forwarded to him and also attached at Appendix D.

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 2013 to October 2014

	25/11 2013	12/12 2013	19/12 2013	09/01 2014	29/01 2014	24/02 2014	31/03 2014	28/04 2014	29/05 2014	25/06 2014	31/07 2014	29/08 2014	01/10 2014	28/10 2014
Cyanophyta (cells/mL)	-	1150	-	-	-	-	-	-	-	-	-	-	-	-
Chlorophyta (cells/mL)	-	39500	22000	123000	34000	-	-	7700	7600	52000	28000	-	-	168000

The cyanophyta results gathered between November 2013 and October 2014 remains low being <100 cells/mL.

The chlorophyta results gathered between November 2013 and October 2014 detail mixed results. All but three (3) of the readings were below the maximum algae level prescribed within the EMP of 50,000 cells/mL. Following the high readings, levels receded back the immediately following month to below the threshold for recreation waters (this high standard has been adopted in this instance even though no recreation use is undertaken).

There appears to be a correlation with increased Chlorophyta levels and low rainfall and unseasonal high temperatures.

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.

2.2 Ground Water

Monthly ground water monitoring was conducted between November 2013 to October 2014. 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.

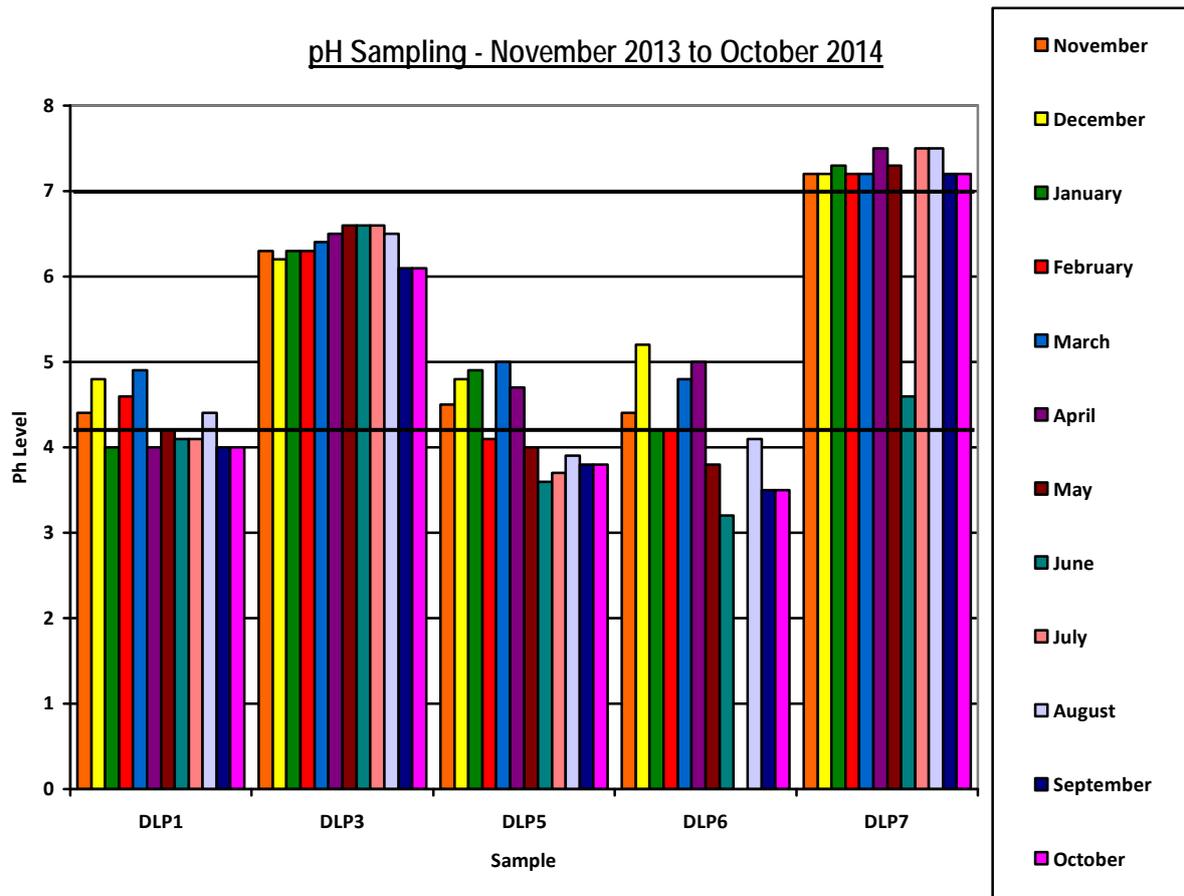


Figure 1: Dunloe Sands - Ground Water - Chemical (pH Test) Results November 2013 to October 2014

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 some 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 (particularly DLP7).

DLP1, 3, 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 high levels of rainfall following dry periods and generally low lying environments conducive to acidic soils (<4m AHD). 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.

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.

Groundwater Electroconductivity - November 2013 to October 2014

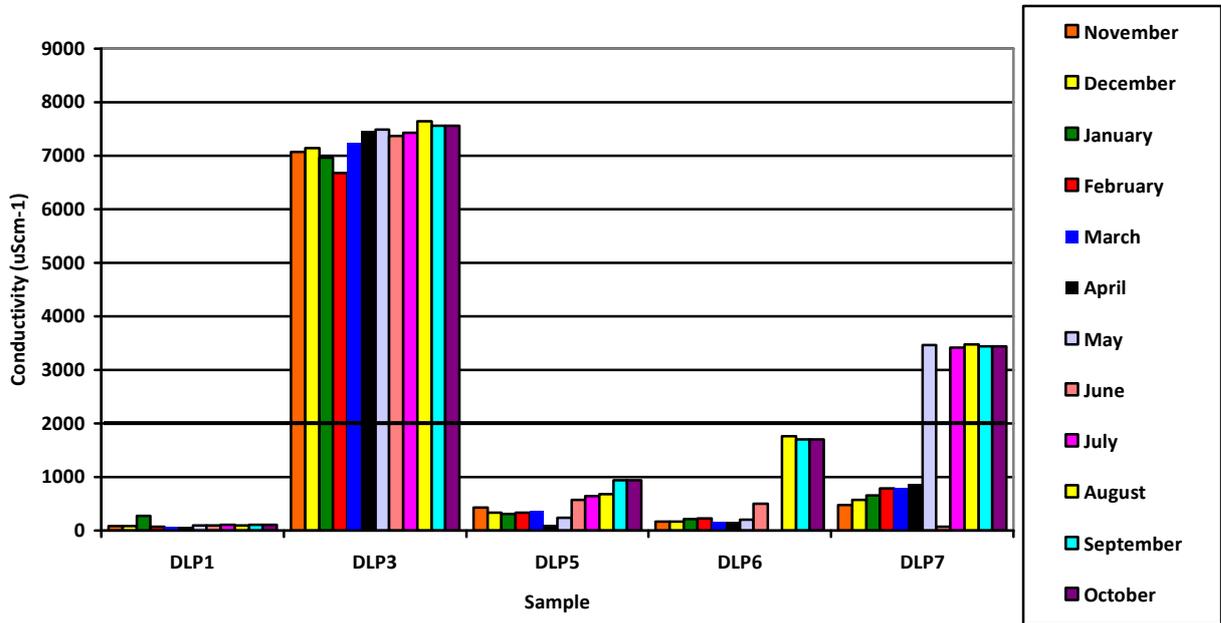


Figure 2: Dunloe Sands - Ground Water - Chemical (EC Test) Results November 2013 to October 2014

The majority of the samples taken produce considerably low EC levels when compared to the EMP maximum interim target of 2000uS/cm⁻¹. However, two samples sites; DLP3 and DLP7 present conductivity levels above the maximum interim target of 2,000uS/cm⁻¹ 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.

Groundwater Redox Potential - November 2013 to October 2014

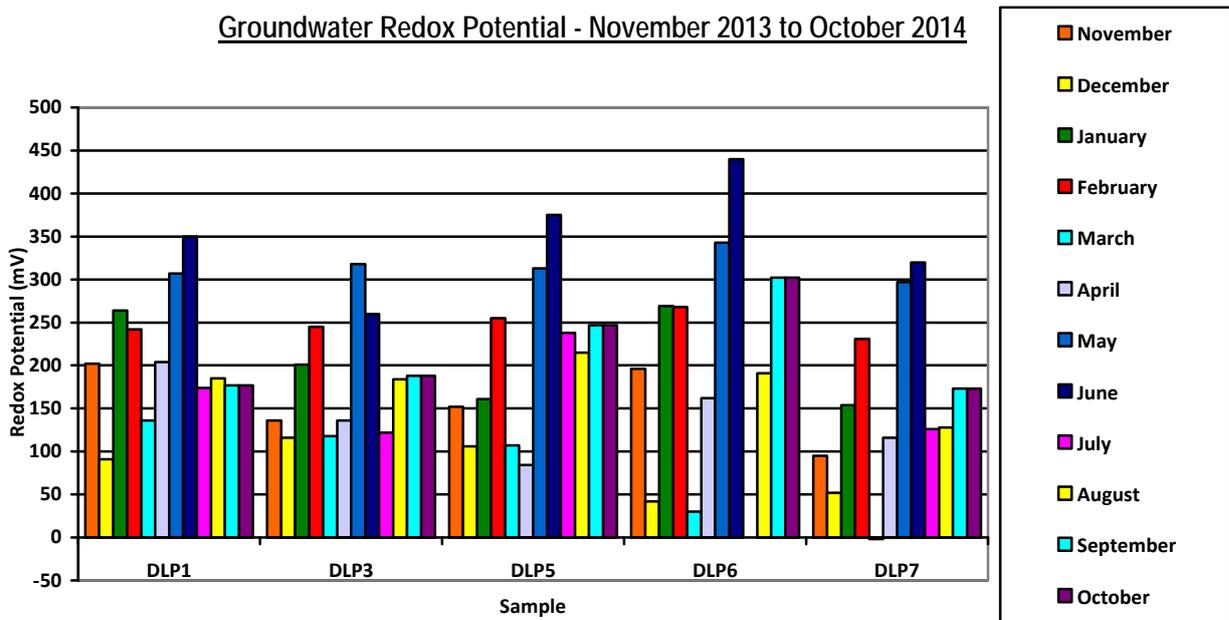


Figure 3: Dunloe Sands - Ground Water - Chemical (Redox Potential Test) Results November 2013 to October 2014

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 in June correspond with higher than normal midyear rainfalls.

Groundwater Dissolved Oxygen Test Results - November 2013 to October 2014

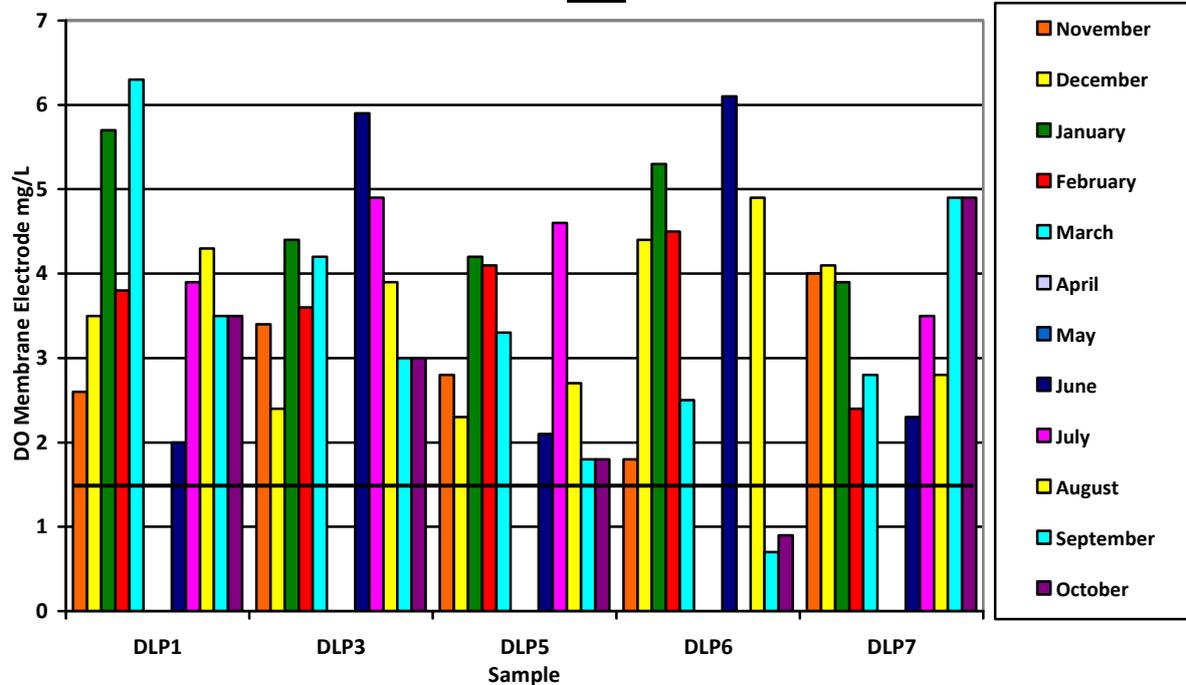


Figure 4: Dunloe Sands - Ground Water - Chemical (DO Test) Results November 2013 to October 2014

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 twelve (12) month monitoring period. The majority of the groundwater samples that were collected are above the minimum interim target however samples collected from DLP 6 present some levels below the target. The improvements in DLP 7 & 3 are pleasing and reverse the trend from the previous periods.

Whilst background testing indicated generally low DO levels inherently across the site, the results for DLP 6 require some further consideration; 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.

2.3 Lake Samples

Chemical Results - Lake Sample - November 2013 to October 2014

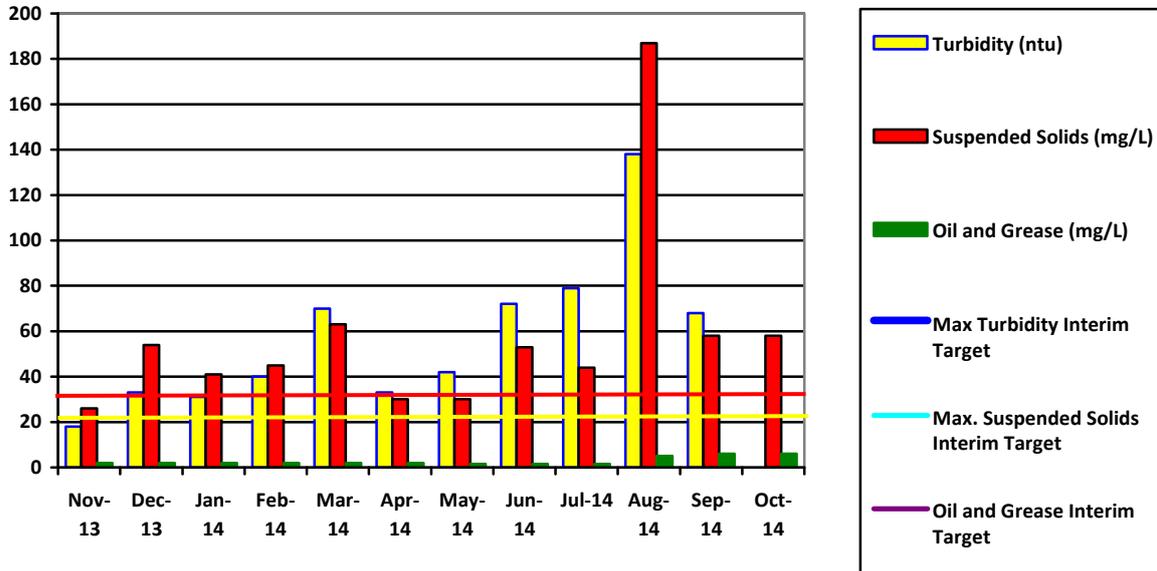


Figure 5: Dunloe Sands - Lake - Chemical Results – November 2013 and October 2014

Interim target levels for turbidity present a maximum level of 20ntu within the EMP. The levels recorded over the twelve (12) month 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 over 300mm of rain fell in August corresponding with the highest turbidity reading. 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 demonstrate borderline compliance, 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.

Chemical Results - Lake Samples - November 2013 to October 2014

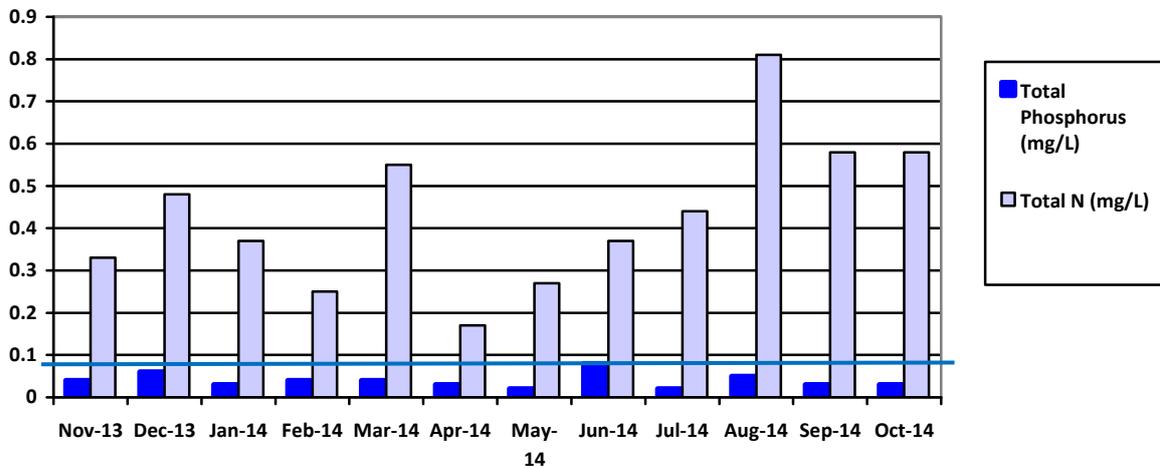


Figure 6: Dunloe Sands - Lake - Chemical Results – November 2013 to October 2014

Total phosphorus levels have a maximum interim target of 0.8mg/L (shown as red line). All sample data results in levels 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 0.8 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. November 2013 to October 2014.

Total Rainfall - November 2013 to October 2014

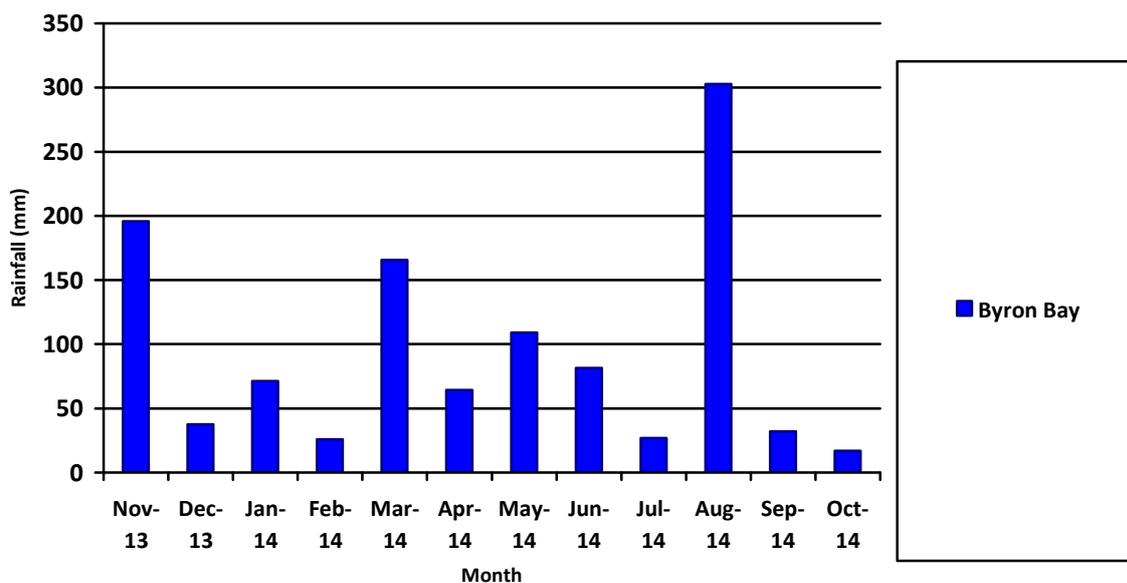


Figure 7: Recorded Rainfall November 2013 to October 2014 (graph needs to change start month)

The recorded rainfall of the three suburbs surrounding Pottsville has been averaged to produce an approximate on-site rainfall. August 2014 presented the highest level of rainfall within the region with a reading of 302.8mm of total rainfall being recorded. In total over the twelve (12) month period approximately 1,129.8mm 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 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 2: Dunloe Sands - Ground Water - Chemical (Chloride Test) Results (mg/L)

December 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	20	2,340	89	20	750
Interim Target	285.0	285.0	285.0	285.0	285.0
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	15	120	110	22	720
Interim Target	285.0	285.0	285.0	285.0	285.0
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	16	2,290	140	17	15
Interim Target	285.0	285.0	285.0	285.0	285.0
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	20	2,370	170	40	740
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.

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

December 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.4	66	2.3	4.5	18
Interim Target	55.0	55.0	55.0	55.0	55.0
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.6	73	2.4	5.6	19
Interim Target	55.0	55.0	55.0	55.0	55.0
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.5	82	4.2	7.0	0.3
Interim Target	55.0	55.0	55.0	55.0	55.0
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.2	71	4.9	45	17
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. All other samples present at levels lower than the interim target.

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

December 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.2	104	7.2	1.5	38
Interim Target	40.0	40.0	40.0	40.0	40.0
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.1	109	6.3	1.8	39
Interim Target	40.0	40.0	40.0	40.0	40.0
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.3	125	9.9	4.5	0.2
Interim Target	40.0	40.0	40.0	40.0	40.0
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<0.1	110	12	23	37
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 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.2	104	7.2	1.5	38
Interim Target	280.0	280.0	280.0	280.0	280.0
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.1	109	6.3	1.8	39
Interim Target	280.0	280.0	280.0	280.0	280.0
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	9.7	1,320	64	16	9.9
Interim Target	280.0	280.0	280.0	280.0	280.0
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	9.6	1,140	75	16	611
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 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 5	43	<5	< 5	26
Interim Target	17.5	17.5	17.5	17.5	17.5
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 5	43	< 5.0	< 5	26
Interim Target	17.5	17.5	17.5	17.5	17.5
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 5	44	<5	< 5	<5
Interim Target	17.5	17.5	17.5	17.5	17.5
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 5	43	< 5	9	25
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 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	6.2	168	15	30	249
Interim Target	175	175	175	175	175
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	3.5	175	12	34	253
Interim Target	175	175	175	175	175
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	6.4	180	9.8	119	4.2
Interim Target	175	175	175	175	175
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	4.3	168	16	958	236
Interim Target	175	175	175	175	175

Comments: Minor exceedances were experienced during both sampling periods at DLP 7. This well is located near the stockpile and plant. Background testing shows that DLP 7 has previously tested with high test results. Efforts to date to clear this well has not had a noticeable impact upon readings, indicating that levels are naturally high in this regard.

A small exceedance was picked up in respect of DLP 3 in June. This was minor and was rectified in the following sample. No further action is required in this respect.

A larger exceedance inconsistent with previous sampling was identified for DLP 6 in August. This will need to be monitored at the next round to determine if there are any trends in this regard.

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

December 2013	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 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
June 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
August 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

Comments: The samples are fully compliant with the interim targets as set out by the EMP.

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

December 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	3.83	3.16	4.81	10	1.33
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	2.44	2.86	3.52	10.5	1.52
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.76	6.47	1.73	13.0	0.85
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	3.93	4.22	11.0	388	1.88
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5

Comments: Exceedance of the target iron levels is noted at DLP 6. Background testing suggests a history of DLP6 and a high reading of iron. Efforts to date to clear or prime these wells have not had a noticeable impact upon readings, indicating that levels are naturally high in this regard.

A small exceedance was identified in August for DLP 5. This will also need to be monitored at the next sampling period for trends, although it is noted that this reading is only slightly higher than the ideal.

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

December 2013	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	0.02	0.57	0.04	0.06	0.08
Interim Target	0.15	0.15	0.15	0.15	0.15
March 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	< 0.01	0.56	< 0.01	0.06	0.04
Interim Target	0.15	0.15	0.15	0.15	0.15
June 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<0.01	0.93	0.05	0.20	<0.01
Interim Target	0.15	0.15	0.15	0.15	0.15
August 2014	DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Sample	<0.01	0.56	0.03	2.01	0.01
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 entirely expected and consistent 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.

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 2013	SW 3	SW 4	SW 9	SW 10
Sample	7.1	6.7	6.8	6.8
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	3.7	3.8	4.6	4.6
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	5.7	6.5	6.6	6.5
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
August 2014	SW 3	SW 4	SW 9	SW 10
Sample	7.9	7.1	7.1	7.2
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5

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

Table 12: Dunloe Sands - Surface Water - Chemical (EC Test) Results (uS/cm¹)

December 2013	SW 3	SW 4	SW 9	SW 10
Sample	25,681	17,021	10,096	15,775
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	1,753	1,354	1,431	1,454
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	19,911	25,363	18,376	17,312
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500
August 2014	SW 3	SW 4	SW 9	SW 10
Sample	41,455	22,190	10,705	9,164
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500

Comments: All of the December, June and August samples taken are exceeding 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 sample readings, particularly as saltwater exhibits similar readings to those identified above.

It is considered likely that the samples were incorrectly 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.

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

December 2013	SW 3	SW 4	SW 9	SW 10
Sample	5.8	5.5	5.2	5.0
Interim Target	> 4	> 4	> 4	> 4
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	2.9	2.5	2.1	2.2
Interim Target	> 4	> 4	> 4	> 4
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	8.9	8.4	7.9	7.6
Interim Target	> 4	> 4	> 4	> 4
August 2014	SW 3	SW 4	SW 9	SW 10
Sample	8.4	8.4	9.3	11
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 March 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 March rainfall came on the back of high summer temperatures and generally low rainfall over the December to February period which would have aided conditions resulting in lower DO readings. These were then observed to recede with lower temperatures through the middle of the year.

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

December 2013	SW 3	SW 4	SW 9	SW 10
Sample	13	15	20	10
Interim Target	< 25	< 25	< 25	< 25
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	42	41	40	40
Interim Target	< 25	< 25	< 25	< 25
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	9	8	16	15
Interim Target	< 25	< 25	< 25	< 25
August 2014	SW 3	SW 4	SW 9	SW 10

Sample	5.8	6	20	30
Interim Target	< 25	< 25	< 25	< 25

Comment: Generally all readings were satisfactory, however increased levels were recorded in March which corresponded to heavy rainfall activity (165.8mm fell in March). Likewise a small exceedance was noted in August at SW10, corresponding with 302mm falling in this period. Further monitoring is required to ensure water clarity.

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

December 2013	SW 3	SW 4	SW 9	SW 10
Sample	0.02	0.03	0.05	0.03
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	0.05	0.04	0.13	0.13
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	<0.02	<0.02	0.05	0.04
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08
August 2014	SW 3	SW 4	SW 9	SW 10
Sample	<0.02	<0.02	0.03	0.11
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. SW9 and SW10 presented levels slightly greater than the interim target in March, however these exceedances are quite minor and rectified in following results. Further monitoring results are to be noted to ensure that Total P levels are maintained to acceptable levels.

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

December 2013	SW 3	SW 4	SW 9	SW 10
Sample	0.34	0.51	0.81	0.56
Interim Target	< 20	< 20	< 20	< 20
March 2014	SW 3	SW 4	SW 9	SW 10
Sample	1.54	1.43	1.64	1.63
Interim Target	< 20	< 20	< 20	< 20
June 2014	SW 3	SW 4	SW 9	SW 10
Sample	0.76	0.50	0.67	0.72
Interim Target	< 20	< 20	< 20	< 20
August 2014	SW 3	SW 4	SW 9	SW 10
Sample	0.20	0.31	0.60	1.06
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 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. As such, a letter outlining progress from the project ecologist has been included within this report (**Appendix D**).

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.

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.

Brock Lamont
Town Planner
Planit Consulting

November 2014

Adam Smith
Director
Planit Consulting

November 2014

Steve Petersen
Director
RAMTECH

November 2014

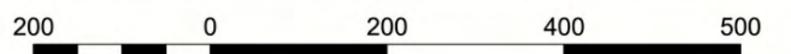
Appendix A Ground Water Location Map





Legend

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



Appendix B

Surface Water Location Map

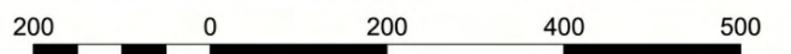




Legend

 Stage 01 & 02 Surfacewater Monitoring Location

 Excavation Area



Appendix C Sampling Raw Data



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3896 & Adam Smith

Lims1 Report No: 14/2795-A
Client Reference: PLUS HARD COPY
Date of Report: 28/10/2014

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Taken By:	Client	No of Samples:	1
Date Taken:	27/10/2014	Date Testing Commenced:	28/10/2014
Date Received:	28/10/2014	Date Testing Completed:	28/10/2014

Sample Description: Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/2795-A/1	1	Lake

COMMENTS:

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



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Accreditation No: 12754 & 13538



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

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/2795-A
Date Testing Completed: 28/10/2014
Date of Report: 28/10/2014

Attention: Steve Peterson

Sample Description: Lake - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/2795-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	168,000



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Date Taken:	27/10/2014	Date Testing Commenced:	28/10/2014
Date Received:	28/10/2014	Date Testing Completed:	28/10/2014

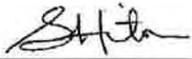
Sample Description: Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/2795-A/1	1	Lake

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



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Attention: Steve Peterson

Sample Description: Lake - Algae

Lims1 Report No: 14/2795-A
Date Testing Completed: 28/10/2014
Date of Report: 28/10/2014

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/2795-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	168,000



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Taken By: Client
Date Taken: 29/09/2014
Date Received: 30/09/2014

No of Samples: 10
Date Testing Commenced: 30/09/2014
Date Testing Completed: 09/10/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7
6	SW 3
7	SW 4
8	SW 9
9	SW 10
10	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.



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 NSW 2484
Attention: Steve Peterson

Lims1 Report No: 14/2562-C
Date Testing Completed: 09/10/2014
Date of Report: 09/10/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			29/09/2014	29/09/2014	29/09/2014	29/09/2014	29/09/2014
Date Received:			30/09/2014	30/09/2014	30/09/2014	30/09/2014	30/09/2014
Date Testing Commenced:			30/09/2014	30/09/2014	30/09/2014	30/09/2014	30/09/2014
Test	Method	Units	14/2562-C-1	14/2562-C-2	14/2562-C-3	14/2562-C-4	14/2562-C-5
pH	P1	pH units	4.0	6.1	3.8	3.5	7.2
Conductivity	P2	μScm^{-1}	108	7,558	942	1,699	3,436
DO (membrane electrode)	P12	mg/L	3.5	3.0	1.8	<1.0	4.9
*Redox Potential	P16	mV	+177	+188	+247	+302	+173
Alkalinity as CaCO ₃	C10	mg/L	--	--	--	--	--
Bicarbonate HCO ₃	C10	mg/L	--	--	--	--	--
Chloride	C20	mg/L	--	--	--	--	--
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	--	--	--	--	--
Calcium	M8	mg/L	--	--	--	--	--
Magnesium	M8	mg/L	--	--	--	--	--
Potassium M8	M8	mg/L	--	--	--	--	--
Sulphur as Sulphate	M8	mg/L	--	--	--	--	--
Arsenic (Total)	M7	mg/L	--	--	--	--	--
Iron (Total)	M8	mg/L	--	--	--	--	--
Manganese (Total)	M8	mg/L	--	--	--	--	--

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 NSW 2484
Attention: Steve Peterson

Lims1 Report No: 14/2562-C
Date Testing Completed: 09/10/2014
Date of Report: 09/10/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			SW 3	SW 4	SW 9	SW 10	Lake
Date Taken:			29/09/2014	29/09/2014	29/09/2014	29/09/2014	29/09/2014
Date Received:			30/09/2014	30/09/2014	30/09/2014	30/09/2014	30/09/2014
Date Testing Commenced:			30/09/2014	30/09/2014	30/09/2014	30/09/2014	30/09/2014
Test	Method	Units	14/2562-C-6	14/2562-C-7	14/2562-C-8	14/2562-C-9	14/2562-C-10
pH	P1	pH units	7.9	7.1	7.1	7.2	3.8
Conductivity	P2	μScm^{-1}	41,455	22,190	10,705	9,164	971
DO (membrane electrode)	P12	mg/L	8.4	8.4	9.3	11	8.0
*Redox Potential	P16	mV	--	--	--	--	--
Alkalinity as CaCO ₃	C10	mg/L	--	--	--	--	<1
Bicarbonate HCO ₃	C10	mg/L	--	--	--	--	<1
Chloride	C20	mg/L	--	--	--	--	38
Turbidity	P8	NTU	6.2	9.8	36	46	68
Suspended Solids	P4	mg/L	5.8	6.0	20	30	58
Oil and Grease	C8	mg/L	--	--	--	--	6
Total-N	C55	mg/L	0.20	0.31	0.60	1.06	0.58
Total Phosphorus-P	C17	mg/L	<0.02	<0.02	0.03	0.11	0.03
Calcium	M8	mg/L	--	--	--	--	123
Magnesium	M8	mg/L	--	--	--	--	16
Potassium M8	M8	mg/L	--	--	--	--	7
Sulphur as Sulphate	M8	mg/L	--	--	--	--	505
Arsenic (Total)	M7	mg/L	--	--	--	--	<0.005
Iron (Total)	M8	mg/L	--	--	--	--	11.0
Manganese (Total)	M8	mg/L	--	--	--	--	106



Tweed Laboratory Centre

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Attention: Steve Peterson
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Taken By: Client	No of Samples: 1
Date Taken: 29/09/2014	Date Testing Commenced: 30/09/2014
Date Received: 30/09/2014	Date Testing Completed: 01/10/2014

Sample Description: Lake - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/2562-A/1	1	Lake Algae

COMMENTS:

Results refer to samples as received at the Laboratory.



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MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Lake - Algae

Lims1 Report No: 14/2562-A
Date Testing Completed: 01/10/2014
Date of Report: 01/10/2014

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/2562-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



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Client Reference: PLUS HARD COPY
Date of Report: 10/09/2014

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Taken By: Client
Date Taken: 29/08/2014
Date Received: 29/08/2014

No of Samples: 1
Date Testing Commenced: 29/08/2014
Date Testing Completed: 10/09/2014

Sample Description: Dunloe Sands Lake Water - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.



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Client: Ramtech Pty Ltd
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MURWILLUMBAH
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Attention: Steve Peterson

Lims1 Report No: 14/2287-C
Date Testing Completed: 10/09/2014
Date of Report: 10/09/2014

Sample Description: Dunloe Sands Lake Water - Chemical

Sample Identification:			Lake Water
Date Taken:			29/08/2014
Date Received:			29/08/2014
Date Testing Commenced:			29/08/2014
Test	Method	Units	14/2287-C-1
pH	P1	pH units	4.5
Conductivity	P2	μScm^{-1}	960
Turbidity	P8	NTU	138
Suspended Solids	P4	mg/L	187
Oil and Grease	C8	mg/L	5
Total Phosphorus-P	C17	mg/L	0.05
Total-N	C55	mg/L	0.81



Tweed Laboratory Centre

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Taken By: Client
Date Taken: 29/08/2014
Date Received: 29/08/2014

No of Samples: 5
Date Testing Commenced: 29/08/2014
Date Testing Completed: 04/09/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.



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Attention: Steve Peterson

Lims1 Report No: 14/2286-C
Date Testing Completed: 04/09/2014
Date of Report: 04/09/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			29/08/2014	29/08/2014	29/08/2014	29/08/2014	29/08/2014
Date Received:			29/08/2014	29/08/2014	29/08/2014	29/08/2014	29/08/2014
Date Testing Commenced:			29/08/2014	29/08/2014	29/08/2014	29/08/2014	29/08/2014
Test	Method	Units	14/2286-C-1	14/2286-C-2	14/2286-C-3	14/2286-C-4	14/2286-C-5
pH	P1	pH units	4.4	6.5	3.9	4.1	7.5
Conductivity	P2	μScm^{-1}	97	7,643	678	1,764	3,477
DO (membrane electrode)	P12	mg/L	4.3	3.9	2.7	4.9	2.8
*Redox Potential	P16	mV	+185	+184	+215	+191	+128
Alkalinity as CaCO ₃	C10	mg/L	NP	110	NP	NP	400
P-Alkalinity as CaCO ₃	C10	mg/L	NP	NP	NP	NP	NP
Bicarbonate HCO ₃	C10	mg/L	NP	68	NP	NP	245
Chloride	C20	mg/L	20	2,370	170	40	740
Calcium	M8	mg/L	0.2	71	4.9	45	17
Magnesium	M8	mg/L	<0.1	110	12	23	37
Sodium	M8	mg/L	9.6	1,140	75	16	611
Potassium M8	M8	mg/L	<5	43	<5	9	25
Sulphur as Sulphate	M8	mg/L	4.3	168	16	958	236
Aluminium (Total)	M8	mg/L	0.36	0.02	0.76	74.0	0.37
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	3.93	4.22	11.0	388	1.88
Manganese (Total)	M8	mg/L	<0.01	0.56	0.03	2.01	0.01
Carbonate (CO ₃)	C10	mg/L	NP	NP	NP	NP	NP



Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samlereception@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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3896 & Adam Smith

Lims1 Report No: 14/2287-A
Client Reference: PLUS HARD COPY
Date of Report: 01/09/2014

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Taken By: Client
Date Taken: 29/08/2014
Date Received: 29/08/2014

No of Samples: 1
Date Testing Commenced: 29/08/2014
Date Testing Completed: 01/09/2014

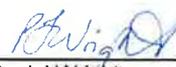
Sample Description: Dunloe Sands Lake Water - Algae

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:


Accredited for compliance with ISO/IEC 17025

Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

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

Lims1 Report No: 14/2287-A
Date Testing Completed: 01/09/2014
Date of Report: 01/09/2014

Sample Description: Dunloe Sands Lake Water - Algae

Sample Identification:			Lake Water
Date Taken:			29/08/2014
Date Received:			29/08/2014
Date Testing Commenced:			29/08/2014
Test	Method	Units	14/2287-A-1
Algae Count	B9		<100



Tweed Laboratory Centre

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

Page 1 of 2

Attention: Steve Peterson
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Lims1 Report No: 14/2002-C
Client Reference:
Date of Report: 13/08/2014

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Taken By: Client
Date Taken: 30/07/2014
Date Received: 30/07/2014

No of Samples: 1
Date Testing Commenced: 30/07/2014
Date Testing Completed: 13/08/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake

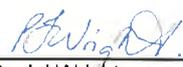
COMMENTS:

Results refer to samples as received at the Laboratory.



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Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

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

Lims1 Report No: 14/2002-C
Date Testing Completed: 13/08/2014
Date of Report: 13/08/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake
Date Taken:			30/07/2014
Date Received:			30/07/2014
Date Testing Commenced:			30/07/2014
Test	Method	Units	14/2002-C-1
pH	P1	pH units	4.3
Conductivity	P2	μScm^{-1}	917
Turbidity	P8	NTU	79
Suspended Solids	P4	mg/L	44
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.02
Total-N	C55	mg/L	0.44



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Address: 30-32 Lundberg Drive
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Page 1 of 2

Attention: Steve Peterson
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Lims1 Report No: 14/2000-C
Client Reference:
Date of Report: 05/08/2014

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Taken By: Client
Date Taken: 30/07/2014
Date Received: 30/07/2014

No of Samples: 4
Date Testing Commenced: 30/07/2014
Date Testing Completed: 05/08/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 7

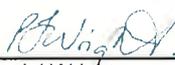
COMMENTS:

Results refer to samples as received at the Laboratory.
 * NATA accreditation does not cover the performance of this service
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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 Dr Paul J Wright
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Tweed Laboratory Centre

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

Lims1 Report No: 14/2000-C
Date Testing Completed: 05/08/2014
Date of Report: 05/08/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 7
Date Taken:			30/07/2014	30/07/2014	30/07/2014	30/07/2014
Date Received:			30/07/2014	30/07/2014	30/07/2014	30/07/2014
Date Testing Commenced:			30/07/2014	30/07/2014	30/07/2014	30/07/2014
Test	Method	Units	14/2000-C-1	14/2000-C-2	14/2000-C-3	14/2000-C-4
pH	P1	pH units	4.1	6.6	3.7	7.5
Conductivity	P2	μScm^{-1}	112	7,431	639	3,414
DO (membrane electrode)	P12	mg/L	3.9	4.9	4.6	3.5
*Redox Potential	P16	mV	+174	+122	+238	+126
Alkalinity as CaCO ₃	C10	mg/L	<1	110	<1	390
Bicarbonate HCO ₃	C10	mg/L	<1	66	<1	240
Chloride	C20	mg/L	19	2,420	140	760
Calcium	M8	mg/L	0.4	74	13	19
Magnesium	M8	mg/L	0.2	114	11	41
Sodium	M8	mg/L	11	1,200	69	656
Potassium M8	M8	mg/L	<5	46	<5	27
Sulphur as Sulphate	M8	mg/L	7.7	177	47	261
Aluminium (Total)	M8	mg/L	0.77	0.03	3.96	0.41
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	0.62	3.97	2.00	1.42
Manganese (Total)	M8	mg/L	<0.01	0.58	0.11	0.02



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/2000-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 31/07/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 30/07/2014 **Date Testing Commenced:** 30/07/2014
Date Received: 30/07/2014 **Date Testing Completed:** 31/07/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/2000-A/1	1	Lake Water - Algae

COMMENTS:

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



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 Dr Sally Everson
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sallye@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/2000-A
Date Testing Completed: 31/07/2014
Date of Report: 31/07/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/2000-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	28,000



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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd	Page 1 of 2
Address:	30-32 Lundberg Drive MURWILLUMBAH NSW 2484	
Attention:	Steve Peterson	Lims1 Report No: 14/1699-C
Copy To:	Fax: 02 6672 3896 & Adam Smith	Client Reference:
		Date of Report: 09/07/2014

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Taken By:	Client	No of Samples:	1
Date Taken:	25/06/2014	Date Testing Commenced:	25/06/2014
Date Received:	25/06/2014	Date Testing Completed:	08/07/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.

Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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Tania Collins
 (Instrument Analyst)
tcollins@tweed.nsw.gov.au

Tweed Laboratory Centre

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

Lims1 Report No: 14/1699-C
Date Testing Completed: 08/07/2014
Date of Report: 09/07/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake
Date Taken:			25/06/2014
Date Received:			25/06/2014
Date Testing Commenced:			25/06/2014
Test	Method	Units	14/1699-C-1
pH	P1	pH units	3.8
Conductivity	P2	μScm^{-1}	916
DO (membrane electrode)	P12	mg/L	9.4
Alkalinity as CaCO ₃	C10	mg/L	<1
Bicarbonate HCO ₃	C10	mg/L	<1
Turbidity	P8	NTU	72
Suspended Solids	P4	mg/L	53
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.08
Total-N	C55	mg/L	0.37
Chloride	C20	mg/L	35
Calcium	M8	mg/L	109
Magnesium	M8	mg/L	16
Sodium	M8	mg/L	23
Potassium M8	M8	mg/L	6
Sulphur as Sulphate	M8	mg/L	413
Aluminium (Total)	M8	mg/L	26.0
Arsenic (Total)	M7	mg/L	<0.005
Iron (Total)	M8	mg/L	12.0
Manganese (Total)	M8	mg/L	1.05



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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3896 & Adam Smith

Lims1 Report No: 14/1698-C
Client Reference:
Date of Report: 04/07/2014

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Taken By: Client
Date Taken: 25/06/2014
Date Received: 25/06/2014

No of Samples: 4
Date Testing Commenced: 25/06/2014
Date Testing Completed: 03/07/2014

Sample Description: Dunloe Sands SW Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	SW 3
2	SW 4
3	SW 9
4	SW 10

COMMENTS:

Results refer to samples as received at the Laboratory.
Dissolved Oxygen, Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

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

Lims1 Report No: 14/1698-C
Date Testing Completed: 03/07/2014
Date of Report: 04/07/2014

Sample Description: Dunloe Sands SW Water Samples - Chemical

Sample Identification:			SW 3	SW 4	SW 9	SW 10
Date Taken:			25/06/2014	25/06/2014	25/06/2014	25/06/2014
Date Received:			25/06/2014	25/06/2014	25/06/2014	25/06/2014
Date Testing Commenced:			25/06/2014	25/06/2014	25/06/2014	25/06/2014
Test	Method	Units	14/1698-C-1	14/1698-C-2	14/1698-C-3	14/1698-C-4
pH	P1	pH units	5.7	6.5	6.6	6.5
Conductivity	P2	μScm^{-1}	19,911	25,363	18,376	17,312
DO (membrane electrode)	P12	mg/L	8.9	8.4	7.9	7.6
Suspended Solids	P4	mg/L	9.0	8.0	16	15
Turbidity	P8	NTU	14	12	30	37
Total-N	C55	mg/L	0.76	0.50	0.67	0.72
Total Phosphorus-P	C17	mg/L	<0.02	<0.02	0.05	0.04



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Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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Attention: Steve Peterson **Lims1 Report No:** 14/1697-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 04/07/2014

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Taken By: Client **No of Samples:** 5
Date Taken: 25/06/2014 **Date Testing Commenced:** 25/06/2014
Date Received: 25/06/2014 **Date Testing Completed:** 03/07/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
 * NATA accreditation does not cover the performance of this service
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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

Tweed Laboratory Centre

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

Lims1 Report No: 14/1697-C
Date Testing Completed: 03/07/2014
Date of Report: 04/07/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Date Received:			25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Date Testing Commenced:			25/06/2014	25/06/2014	25/06/2014	25/06/2014	25/06/2014
Test	Method	Units	14/1697-C-1	14/1697-C-2	14/1697-C-3	14/1697-C-4	14/1697-C-5
pH	P1	pH units	4.1	6.6	3.6	3.2	4.6
Conductivity	P2	μScm^{-1}	98	7,370	566	497	69
DO (membrane electrode)	P12	mg/L	2.0	5.9	2.1	6.1	2.3
*Redox Potential	P16	mV	+350	+260	+375	+440	+320
Alkalinity as CaCO ₃	C10	mg/L	<1	110	<1	<1	1
Bicarbonate HCO ₃	C10	mg/L	<1	70	<1	<1	<1
Chloride	C20	mg/L	16	2,290	140	17	15
Calcium	M8	mg/L	0.5	82	4.2	7.0	0.3
Magnesium	M8	mg/L	0.3	125	9.9	4.5	0.2
Sodium	M8	mg/L	9.7	1,320	64	16	9.9
Potassium M8	M8	mg/L	<5	44	<5	<5	<5
Sulphur as Sulphate	M8	mg/L	6.4	180	9.8	119	4.2
Aluminium (Total)	M8	mg/L	0.64	0.04	1.27	6.28	0.37
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	0.76	6.47	1.73	13.0	0.85
Manganese (Total)	M8	mg/L	<0.01	0.93	0.05	0.20	<0.01



Tweed Laboratory Centre

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Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/1699-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 26/06/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 25/06/2014 **Date Testing Commenced:** 25/06/2014
Date Received: 25/06/2014 **Date Testing Completed:** 26/06/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/1699-A/1	1	Lake Water - Algae

COMMENTS:

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



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 Tania Collins
 (Instrument Analyst)
tcollins@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/1699-A
Date Testing Completed: 26/06/2014
Date of Report: 26/06/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/1699-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	52000



Tweed Laboratory Centre

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Client: Ramtech Pty Ltd Page 1 of 2
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Attention: Steve Peterson **Lims1 Report No:** 14/1437-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 05/06/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 28/05/2014 **Date Testing Commenced:** 29/05/2014
Date Received: 29/05/2014 **Date Testing Completed:** 05/06/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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 Accreditation No: 12754 & 13538

Paul J Wright

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

Tweed Laboratory Centre

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

Lims1 Report No: 14/1437-C
Date Testing Completed: 05/06/2014
Date of Report: 05/06/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			28/05/2014
Date Received:			29/05/2014
Date Testing Commenced:			29/05/2014
Test	Method	Units	14/1437-C-1
pH	P1	pH units	4.1
Conductivity	P2	μScm^{-1}	895
DO (membrane electrode)	P12	mg/L	9.2
Turbidity	P8	NTU	42
Suspended Solids	P4	mg/L	30
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	<0.02
Total-N	C55	mg/L	0.27



Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samplerception@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 Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/1437-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 29/05/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 28/05/2014 **Date Testing Commenced:** 29/05/2014
Date Received: 29/05/2014 **Date Testing Completed:** 29/05/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/1437-A/1	1	Lake Water

COMMENTS:

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



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Accreditation No: 12754 & 13538


 Dr Sally Everson
 (Senior Technical Officer – Phycology)
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Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/1437-A
Date Testing Completed: 29/05/2014
Date of Report: 29/05/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/1437-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	7,600
	Cryptophyta (Cryptophytes)	B9	cells/mL	420



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/1436-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 29/05/2014

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Taken By: Client **No of Samples:** 5
Date Taken: 28/05/2014 **Date Testing Commenced:** 29/05/2014
Date Received: 29/05/2014 **Date Testing Completed:** 29/05/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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Dr Paul J Wright
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Tweed Laboratory Centre

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

Lims1 Report No: 14/1436-C
Date Testing Completed: 29/05/2014
Date of Report: 29/05/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			28/05/2014	28/05/2014	28/05/2014	28/05/2014	28/05/2014
Date Received:			29/05/2014	29/05/2014	29/05/2014	29/05/2014	29/05/2014
Date Testing Commenced:			29/05/2014	29/05/2014	29/05/2014	29/05/2014	29/05/2014
Test	Method	Units	14/1436-C-1	14/1436-C-2	14/1436-C-3	14/1436-C-4	14/1436-C-5
pH	P1	pH units	4.2	6.6	4.0	3.8	7.3
Conductivity	P2	μScm^{-1}	95	7,484	239	198	3,468
*Redox Potential	P16	mV	+307	+318	+313	+343	+297



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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Attention: Steve Peterson **Lims1 Report No:** 14/1153-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 06/05/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 28/04/2014 **Date Testing Commenced:** 29/04/2014
Date Received: 29/04/2014 **Date Testing Completed:** 06/05/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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

Lims1 Report No: 14/1153-C
Date Testing Completed: 06/05/2014
Date of Report: 06/05/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			28/04/2014
Date Received:			29/04/2014
Date Testing Commenced:			29/04/2014
Test	Method	Units	14/1153-C-1
pH	P1	pH units	4.4
Conductivity	P2	μScm^{-1}	874
Turbidity	P8	NTU	33
Suspended Solids	P4	mg/L	30
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.03
Total-N	C55	mg/L	0.17



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FINAL CERTIFICATE OF ANALYSIS

Client:	Ramtech Pty Ltd	Page 1 of 2
Address:	30-32 Lundberg Drive MURWILLUMBAH NSW 2484	
Attention:	Steve Peterson	Lims1 Report No: 14/1152-C
Copy To:	Fax: 02 6672 3896 & Adam Smith	Client Reference:
		Date of Report: 01/05/2014

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Taken By:	Client	No of Samples:	5
Date Taken:	24/04/2014	Date Testing Commenced:	29/04/2014
Date Received:	29/04/2014	Date Testing Completed:	01/05/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

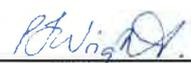
Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
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 The results may not reflect the true level at the time of sampling.



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Client: Ramtech Pty Ltd
Address: 30-32 Lundberg Drive
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NSW 2484
Attention: Steve Peterson

Lims1 Report No: 14/1152-C
Date Testing Completed: 01/05/2014
Date of Report: 01/05/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			24/04/2014	24/04/2014	24/04/2014	24/04/2014	24/04/2014
Date Received:			29/04/2014	29/04/2014	29/04/2014	29/04/2014	29/04/2014
Date Testing Commenced:			29/04/2014	29/04/2014	29/04/2014	29/04/2014	29/04/2014
Test	Method	Units	14/1152-C-1	14/1152-C-2	14/1152-C-3	14/1152-C-4	14/1152-C-5
pH	P1	pH units	4.0	6.5	4.7	5.0	7.5
Conductivity	P2	μScm^{-1}	75	7,448	110	156	3,452
*Redox Potential	P16	mV	+204	+136	+84	+162	+116



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
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Attention: Steve Peterson **Lims1 Report No:** 14/1153-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 29/04/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 28/04/2014 **Date Testing Commenced:** 29/04/2014
Date Received: 29/04/2014 **Date Testing Completed:** 29/04/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/1153-A/1	1	Lake Water

COMMENTS:

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



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Client: Ramtech Pty Ltd

Address:
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Lims1 Report No: 14/1153-A
Date Testing Completed: 29/04/2014
Date of Report: 29/04/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/1153-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	7700
	Diatoms(Bacillariophyta)	B9	cells/mL	45



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Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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Attention: Steve Peterson **Lims1 Report No:** 14/0906-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 10/04/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 31/03/2014 **Date Testing Commenced:** 31/03/2014
Date Received: 31/03/2014 **Date Testing Completed:** 10/04/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.
 Dissolved Oxygen, Conductivity and pH should be performed on site.
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Tweed Laboratory Centre

Client: Ramtech Pty Ltd
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MURWILLUMBAH
NSW 2484
Attention: Steve Peterson

Lims1 Report No: 14/0906-C
Date Testing Completed: 10/04/2014
Date of Report: 10/04/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			31/03/2014
Date Received:			31/03/2014
Date Testing Commenced:			31/03/2014
Test	Method	Units	14/0906-C-1
pH	P1	pH units	4.9
Conductivity	P2	μScm^{-1}	800
DO (membrane electrode)	P12	mg/L	7.5
Turbidity	P8	NTU	70
Suspended Solids	P4	mg/L	63
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.04
Total-N	C55	mg/L	0.55



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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Attention: Steve Peterson **Lims1 Report No:** 14/0907-C
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Date of Report: 10/04/2014

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Taken By: Client **No of Samples:** 4
Date Taken: 31/03/2014 **Date Testing Commenced:** 31/03/2014
Date Received: 31/03/2014 **Date Testing Completed:** 10/04/2014

Sample Description: Dunloe Sands SW Water Samples - Chemical

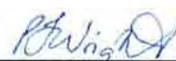
Sample/Site No	Sample/Site Description
1	SW 3
2	SW 4
3	SW 9
4	SW 10

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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

Lims1 Report No: 14/0907-C
Date Testing Completed: 10/04/2014
Date of Report: 10/04/2014

Sample Description: Dunloe Sands SW Water Samples - Chemical

Sample Identification:			SW 3	SW 4	SW 9	SW 10
Date Taken:			31/03/2014	31/03/2014	31/03/2014	31/03/2014
Date Received:			31/03/2014	31/03/2014	31/03/2014	31/03/2014
Date Testing Commenced:			31/03/2014	31/03/2014	31/03/2014	31/03/2014
Test	Method	Units	14/0907-C-1	14/0907-C-2	14/0907-C-3	14/0907-C-4
pH	P1	pH units	3.7	3.8	4.6	4.6
Conductivity	P2	μScm^{-1}	1,753	1,354	1,431	1,454
DO (membrane electrode)	P12	mg/L	2.9	2.5	2.1	2.2
Turbidity	P8	NTU	77	76	30	32
Suspended Solids	P4	mg/L	42	41	40	40
Total Phosphorus-P	C17	mg/L	0.05	0.04	0.13	0.13
Total-N	C55	mg/L	1.54	1.43	1.64	1.63



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
MURWILLUMBAH
NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0908-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 08/04/2014

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Taken By: Client **No of Samples:** 5
Date Taken: 31/03/2014 **Date Testing Commenced:** 31/03/2014
Date Received: 31/03/2014 **Date Testing Completed:** 07/04/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

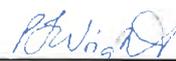
Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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Tweed Laboratory Centre

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

Lims1 Report No: 14/0908-C
Date Testing Completed: 07/04/2014
Date of Report: 08/04/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			31/03/2014	31/03/2014	31/03/2014	31/03/2014	31/03/2014
Date Received:			31/03/2014	31/03/2014	31/03/2014	31/03/2014	31/03/2014
Date Testing Commenced:			31/03/2014	31/03/2014	31/03/2014	31/03/2014	31/03/2014
Test	Method	Units	14/0908-C-1	14/0908-C-2	14/0908-C-3	14/0908-C-4	14/0908-C-5
pH	P1	pH units	4.9	6.4	5.0	4.8	7.2
Conductivity	P2	μScm^{-1}	72	7,234	359	165	3,356
DO (membrane electrode)	P12	mg/L	6.3	4.2	3.3	2.5	2.8
*Redox Potential	P16	mV	+136	+118	+107	+130	-2
Alkalinity as CaCO ₃	C10	mg/L	3	120	2	3	410
Bicarbonate HCO ₃	C10	mg/L	2	74	1	2	250
Chloride	C20	mg/L	15	120	110	22	720
Calcium	M8	mg/L	0.6	73	2.4	5.6	19
Magnesium	M8	mg/L	0.1	109	6.3	1.8	39
Sodium	M8	mg/L	8.4	1,160	46	12	642
Potassium M8	M8	mg/L	<5	43	<5	<5	26
Sulphur as Sulphate	M8	mg/L	3.5	175	12	34	253
Aluminium (Total)	M8	mg/L	0.18	0.06	0.18	0.38	0.38
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	2.44	2.86	3.52	10.5	1.52
Manganese (Total)	M8	mg/L	<0.01	0.56	<0.01	0.06	0.04



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0906-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 01/04/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 31/03/2014 **Date Testing Commenced:** 31/03/2014
Date Received: 31/03/2014 **Date Testing Completed:** 01/04/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/0906-A/1	1	Lake Water

COMMENTS:

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



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Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/0906-A
Date Testing Completed: 01/04/2014
Date of Report: 01/04/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/0906-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Diatoms(Bacillariophyta)	B9	cells/mL	295



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
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Attention: Steve Peterson **Lims1 Report No:** 14/0568-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 06/03/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 24/02/2014 **Date Testing Commenced:** 26/02/2014
Date Received: 26/02/2014 **Date Testing Completed:** 06/03/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
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NSW 2484
Attention: Steve Peterson

Lims1 Report No: 14/0568-C
Date Testing Completed: 06/03/2014
Date of Report: 06/03/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			24/02/2014
Date Received:			26/02/2014
Date Testing Commenced:			26/02/2014
Test	Method	Units	14/0568-C-1
pH	P1	pH units	4.4
Conductivity	P2	μScm^{-1}	780
DO (membrane electrode)	P12	mg/L	7.7
Turbidity	P8	NTU	40
Suspended Solids	P4	mg/L	45
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.04
Total-N	C55	mg/L	0.25



Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samplerception@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 Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0569-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 06/03/2014

All pages of this Report have been checked and approved.
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Taken By: Client **No of Samples:** 5
Date Taken: 24/02/2014 **Date Testing Commenced:** 26/02/2014
Date Received: 26/02/2014 **Date Testing Completed:** 06/03/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

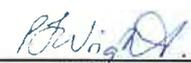
Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



Accredited for compliance with ISO/IEC 17025
 Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

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

Lims1 Report No: 14/0569-C
Date Testing Completed: 06/03/2014
Date of Report: 06/03/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			24/02/2014	24/02/2014	24/02/2014	24/02/2014	24/02/2014
Date Received:			26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
Date Testing Commenced:			26/02/2014	26/02/2014	26/02/2014	26/02/2014	26/02/2014
Test	Method	Units	14/0569-C-1	14/0569-C-2	14/0569-C-3	14/0569-C-4	14/0569-C-5
pH	P1	pH units	4.6	6.3	4.1	4.2	7.2
Conductivity	P2	μScm^{-1}	76	6,677	337	228	3,151
DO (membrane electrode)	P12	mg/L	3.8	3.6	4.1	4.5	2.4
*Redox Potential	P16	mV	+242	+245	+255	+268	+231



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0568-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 26/02/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 24/02/2014 **Date Testing Commenced:** 26/02/2014
Date Received: 26/02/2014 **Date Testing Completed:** 26/02/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

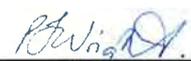
LIMS NO.	Sample/Site No	Sample/Site Description
14/0568-A/1	1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.



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Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

Lims1 Report No: 14/0568-A
Date Testing Completed: 26/02/2014
Date of Report: 26/02/2014

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/0568-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
MURWILLUMBAH
NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0273-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 07/02/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 29/01/2014 **Date Testing Commenced:** 30/01/2014
Date Received: 30/01/2014 **Date Testing Completed:** 07/02/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

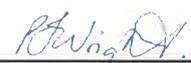
Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
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Tweed Laboratory Centre

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

Lims1 Report No: 14/0273-C
Date Testing Completed: 07/02/2014
Date of Report: 07/02/2014

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			29/01/2014
Date Received:			30/01/2014
Date Testing Commenced:			30/01/2014
Test	Method	Units	14/0273-C-1
pH	P1	pH units	4.4
Conductivity	P2	μScm^{-1}	650
DO (membrane electrode)	P12	mg/L	7.9
Turbidity	P8	NTU	31
Suspended Solids	P4	mg/L	41
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.03
Total-N	C55	mg/L	0.37



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0274-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 03/02/2014

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Taken By: Client **No of Samples:** 5
Date Taken: 29/01/2014 **Date Testing Commenced:** 30/01/2014
Date Received: 30/01/2014 **Date Testing Completed:** 03/02/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

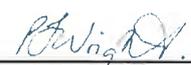
Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.
 Dissolved Oxygen, Conductivity and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



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Tweed Laboratory Centre

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

Lims1 Report No: 14/0274-C
Date Testing Completed: 03/02/2014
Date of Report: 03/02/2014

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			29/01/2014	29/01/2014	29/01/2014	29/01/2014	29/01/2014
Date Received:			30/01/2014	30/01/2014	30/01/2014	30/01/2014	30/01/2014
Date Testing Commenced:			30/01/2014	30/01/2014	30/01/2014	30/01/2014	30/01/2014
Test	Method	Units	14/0274-C-1	14/0274-C-2	14/0274-C-3	14/0274-C-4	14/0274-C-5
pH	P1	pH units	4.0	6.3	4.9	4.2	7.3
Conductivity	P2	μScm^{-1}	279	6,964	314	210	3,243
DO (membrane electrode)	P12	mg/L	5.7	4.4	4.2	5.3	3.9
*Redox Potential	P16	mV	+264	+201	+161	+269	+154



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0273-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 30/01/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 29/01/2014 **Date Testing Commenced:** 30/01/2014
Date Received: 30/01/2014 **Date Testing Completed:** 30/01/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/0273-A/1	1	Lake Water

COMMENTS:

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



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Accreditation No: 12754 & 13538


 Dr Sally Everson
 (Senior Technical Officer – Phycology)
sallye@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/0273-A
Date Testing Completed: 30/01/2014
Date of Report: 30/01/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/0273-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	34,000



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 14/0103-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 14/01/2014

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Taken By: Client **No of Samples:** 1
Date Taken: 09/01/2014 **Date Testing Commenced:** 13/01/2014
Date Received: 13/01/2014 **Date Testing Completed:** 14/01/2014

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
14/0103-A/1	1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
 Sample was received outside recommended technical holding time.
 Client requested analysis go ahead.
 ND = Not Detected.



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 Accreditation No: 12754 & 13538


 Dr Sally Everson
 (Senior Technical Officer – Phycology)
sallye@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 14/0103-A
Date Testing Completed: 14/01/2014
Date of Report: 14/01/2014

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	14/0103-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	<i>Chlamydomonas</i> (Chlorophyta)	B9	cells/mL	123,000



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
MURWILLUMBAH
NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 13/3448-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 24/12/2013

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Taken By: Client **No of Samples:** 1
Date Taken: 12/12/2013 **Date Testing Commenced:** 12/12/2013
Date Received: 12/12/2013 **Date Testing Completed:** 24/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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Accreditation No: 12754 & 13538


Tania Collins
(Instrument Analyst)
tcollins@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd
Address: 30-32 Lundberg Drive
 MURWLLUMBAH
 NSW 2484
Attention: Steve Peterson

Lims1 Report No: 13/3448-C
Date Testing Completed: 24/12/2013
Date of Report: 24/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			12/12/2013
Date Received:			12/12/2013
Date Testing Commenced:			12/12/2013
Test	Method	Units	13/3448-C-1
pH	P1	pH units	4.7
Conductivity	P2	μScm^{-1}	568
DO (membrane electrode)	P12	mg/L	7.7
*Redox Potential	P16	mV	+160
Alkalinity as CaCO ₃	C10	mg/L	2
Bicarbonate HCO ₃	C10	mg/L	1
Turbidity	P8	NTU	33
Suspended Solids	P4	mg/L	54
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.06
Total-N	C55	mg/L	0.48
Chloride	C20	mg/L	22
Calcium	M8	mg/L	75.0
Magnesium	M8	mg/L	8.6
Sodium	M8	mg/L	15.0
Potassium M8	M8	mg/L	5.0
Sulphur as Sulphate	M8	mg/L	244.0
Aluminium (Total)	M8	mg/L	8.92
Arsenic (Total)	M7	mg/L	<0.005
Iron (Total)	M8	mg/L	3.49
Manganese (Total)	M8	mg/L	0.64



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FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3896 & Adam Smith

Lims1 Report No: 13/3449-C
Client Reference:
Date of Report: 24/12/2013

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Taken By: Client
Date Taken: 12/12/2013
Date Received: 12/12/2013

No of Samples: 4
Date Testing Commenced: 12/12/2013
Date Testing Completed: 24/12/2013

Sample Description: Dunloe Sands SW Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	SW 3
2	SW 4
3	SW 9
4	SW 10

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
The results may not reflect the true level at the time of sampling.



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Accreditation No: 12754 & 13538


Tania Collins
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tcollins@tweed.nsw.gov.au

Tweed Laboratory Centre

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

Lims1 Report No: 13/3449-C
Date Testing Completed: 24/12/2013
Date of Report: 24/12/2013

Sample Description: Dunloe Sands SW Water Samples - Chemical

Sample Identification:			SW 3	SW 4	SW 9	SW 10
Date Taken:			12/12/2013	12/12/2013	12/12/2013	12/12/2013
Date Received:			12/12/2013	12/12/2013	12/12/2013	12/12/2013
Date Testing Commenced:			12/12/2013	12/12/2013	12/12/2013	12/12/2013
Test	Method	Units	13/3449-C-1	13/3449-C-2	13/3449-C-3	13/3449-C-4
pH	P1	pH units	7.1	6.7	6.8	6.8
Conductivity	P2	μScm^{-1}	25,681	17,021	10,096	15,775
DO (membrane electrode)	P12	mg/L	5.8	5.5	5.2	5.0
Turbidity	P8	NTU	8.9	17	24	12
Suspended Solids	P4	mg/L	13	15	20	10
Total Phosphorus-P	C17	mg/L	0.02	0.03	0.05	0.03
Total-N	C55	mg/L	0.34	0.51	0.81	0.56



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FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 2

Attention: Steve Peterson
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Lims1 Report No: 13/3450-C
Client Reference:
Date of Report: 24/12/2013

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Taken By: Client
Date Taken: 12/12/2013
Date Received: 12/12/2013

No of Samples: 5
Date Testing Commenced: 12/12/2013
Date Testing Completed: 24/12/2013

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 3
3	DLP 5
4	DLP 6
5	DLP 7

COMMENTS:

Results refer to samples as received at the Laboratory.
* Tests not covered by NATA accreditation.
Dissolved Oxygen, Conductivity and pH should be performed on site.
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Client: Ramtech Pty Ltd
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484
Attention: Steve Peterson

Lims1 Report No: 13/3450-C
Date Testing Completed: 24/12/2013
Date of Report: 24/12/2013

Sample Description: Dunloe Sands DLP Water Samples - Chemical

Sample Identification:			DLP 1	DLP 3	DLP 5	DLP 6	DLP 7
Date Taken:			12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013
Date Received:			12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013
Date Testing Commenced:			12/12/2013	12/12/2013	12/12/2013	12/12/2013	12/12/2013
Test	Method	Units	13/3450-C-1	13/3450-C-2	13/3450-C-3	13/3450-C-4	13/3450-C-5
pH	P1	pH units	4.8	6.2	4.8	5.2	7.2
Conductivity	P2	μScm^{-1}	86	7,140	334	162	3,341
DO (membrane electrode)	P12	mg/L	3.5	2.4	2.3	4.4	4.1
*Redox Potential	P16	mV	+91	+116	+106	+42	+52
Alkalinity as CaCO ₃	C10	mg/L	3	120	3	10	390
Bicarbonate HCO ₃	C10	mg/L	2	73	2	6	238
Chloride	C20	mg/L	20	2,340	89	20	750
Calcium	M8	mg/L	0.4	66.0	2.3	4.5	18.0
Magnesium	M8	mg/L	0.2	104.0	7.2	1.5	38.0
Sodium	M8	mg/L	9.3	1,167.0	40.0	12.0	638.0
Potassium M8	M8	mg/L	<5.0	43.0	<5.0	<5.0	26.0
Sulphur as Sulphate	M8	mg/L	6.2	168.0	15.0	30.0	249.0
Aluminium (Total)	M8	mg/L	0.31	0.06	0.48	0.40	0.35
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	3.83	3.16	4.81	10.0	1.33
Manganese (Total)	M8	mg/L	0.02	0.57	0.04	0.06	0.08



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 13/3511-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 23/12/2013

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Taken By: Client **No of Samples:** 1
Date Taken: 19/12/2013 **Date Testing Commenced:** 19/12/2013
Date Received: 19/12/2013 **Date Testing Completed:** 20/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
13/3511-A/1	1	Lake Water

COMMENTS:

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

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 13/3511-A
Date Testing Completed: 20/12/2013
Date of Report: 23/12/2013

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	13/3511-A/1			
	Total Algal Count	B9	cells/mL	22,000
	No Cyanophyta Detected	B9	cells/mL	ND
	Chlorophyta	B9	cells/mL	22,000



Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 2676 Email: samlereception@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 Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 13/3448-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 13/12/2013

All pages of this Report have been checked and approved.
 This document may not be reproduced except in full.

Taken By: Client **No of Samples:** 1
Date Taken: 12/12/2013 **Date Testing Commenced:** 12/12/2013
Date Received: 12/12/2013 **Date Testing Completed:** 13/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
13/3448-A/1	1	Lake Water

COMMENTS:

Results refer to samples as received at the Laboratory.



Accredited for compliance with ISO/IEC 17025
 Accreditation No: 12754 & 13538


 Sally Everson
 (Senior Technical Officer – Phycology)
sallye@tweed.nsw.gov.au

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

Lims1 Report No: 13/3448-A
Date Testing Completed: 13/12/2013
Date of Report: 13/12/2013

LIMS NO.	Algal Identification	Method Code	Units	Count
13/3448-A/1				
	Total Algal Count	B9	cells/mL	40,650
	Total Cyanophyta	B9	cells/mL	1,150
	Total Cyanophyta Biovolume	B20	mm ³ /L	0.02
	<i>Pseudanabaena</i> (Cyanophyta)	B9	cells/mL	1,150
	<i>Pseudanabaena</i> Biovolume	B20	mm ³ /L	0.02
	Chlorophyta	B9	cells/mL	39,500



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 13/3235-C
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 05/12/2013

All pages of this Report have been checked and approved.
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Taken By: Client **No of Samples:** 1
Date Taken: 25/11/2013 **Date Testing Commenced:** 25/11/2013
Date Received: 25/11/2013 **Date Testing Completed:** 05/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample/Site No	Sample/Site Description
1	Lake Water

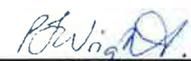
COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.

Conductivity, Dissolved Oxygen and pH should be performed on site.
 The results may not reflect the true level at the time of sampling.



Accredited for compliance with ISO/IEC 17025
 Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

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

Lims1 Report No: 13/3235-C
Date Testing Completed: 05/12/2013
Date of Report: 05/12/2013

Sample Description: Dunloe Sands Lake Water Sample - Chemical

Sample Identification:			Lake Water
Date Taken:			25/11/2013
Date Received:			25/11/2013
Date Testing Commenced:			25/11/2013
Test	Method	Units	13/3235-C-1
pH	P1	pH units	5.9
Conductivity	P2	μScm^{-1}	478
DO (membrane electrode)	P12	mg/L	7.0
Turbidity	P8	NTU	18
Suspended Solids	P4	mg/L	26
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	0.04
Total-N	C55	mg/L	0.33



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FINAL CERTIFICATE OF ANALYSIS

Client: Ramtech Pty Ltd Page 1 of 2
Address: 30-32 Lundberg Drive
 MURWILLUMBAH
 NSW 2484

Attention: Steve Peterson **Lims1 Report No:** 13/3235-A
Copy To: Fax: 02 6672 3896 & Adam Smith **Client Reference:**
Date of Report: 26/11/2013

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Taken By: Client **No of Samples:** 1
Date Taken: 25/11/2013 **Date Testing Commenced:** 25/11/2013
Date Received: 25/11/2013 **Date Testing Completed:** 26/11/2013

Sample Description: Dunloe Sands Lake Water Sample - Algae

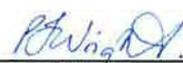
LIMS NO.	Sample/Site No	Sample/Site Description
13/3235-A/1	1	Lake Water

COMMENTS:

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



Accredited for compliance with ISO/IEC 17025
 Accreditation No: 12754 & 13538


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

Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address:
30-32 Lundberg Drive
MURWILLUMBAH

Lims1 Report No: 13/3235-A
Date Testing Completed: 26/11/2013
Date of Report: 26/11/2013

Attention: Steve Peterson

Sample Description: Dunloe Sands Lake Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	13/3235-A/1			
	No Cyanophyta Detected	B9	cells/mL	ND
	Dinophyta (Dinoflagellates)	B9	cells/mL	480



Tweed Laboratory Centre

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FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3896 & Adam Smith

Lims1 Report No: 13/3237-S
Client Job Reference:
Date of Report: 25/11/2013

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Taken By: Client
Date Taken: 25/11/2013
Date Received: 25/11/2013

No of Samples: 5
Date Testing Commenced: 25/11/2013
Date Testing Completed: 25/11/2013

Sample Description: Dunloe Sands Soil Samples - ASS Chromium

Sample/Site No	Sample/Site Description
1	Soil # 1
2	Soil # 2
3	Soil # 3
4	Soil # 4
5	Soil # 5

COMMENTS:

Results refer to samples as received at the Laboratory.
 * Tests not covered by NATA accreditation.



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

Tweed Laboratory Centre

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

Lims1 Report No: 13/3237-S
Date Testing Completed: 25/11/2013
Date of Report: 25/11/2013

Sample Description: Dunloe Sands Soil Samples - ASS Chromium

Sample Identification:			1	2	3	4	5
Date Taken:			25/11/2013	25/11/2013	25/11/2013	25/11/2013	25/11/2013
Date Received:			25/11/2013	25/11/2013	25/11/2013	25/11/2013	25/11/2013
Date Testing Commenced:			25/11/2013	25/11/2013	25/11/2013	25/11/2013	25/11/2013
Test	Method	Units	13/3237-S-1	13/3237-S-2	13/3237-S-3	13/3237-S-4	13/3237-S-5
*pH field		pH units	7.0	5.5	6.3	6.6	5.5
*pH field oxidised		pH Units	6.2	3.0	3.9	3.9	3.0



Appendix D Vegetation Correspondence





Our Ref: 00390

Date: 1st December 2014

Chairman (Mr. Paul Morgan)
Dunloe Sands Community Consultative Committee
By email: ramtech@norex.com.au and paulm@tweed.nsw.gov.au

Dear Mr. Chairman,

RE: DUNLOE SANDS REHABILITATION / REGENERATION WORKS

I refer to the request for information relating to the works undertaken as part of the rehabilitation at the Dunloe Sands site and provide the following information in respect to the issues raised by a committee member. A copy of this correspondence will also be attached the now due AEMR and a copy will also be sent to the NSW Department of Planning.

In providing this response we have undertaken a detailed review of the rehabilitation and regeneration offered up by the landowner. This review has resulted in the findings that the land subject to regeneration and rehabilitation demonstrates significant uptake and success, both in respect of species diversity, but also in respect of vigour and establishment of species on site.

It is pertinent to also consider the following as it relates to the background of the regeneration works:-

- a. The land the subject to regeneration and rehabilitation was previously grazing lands that had been established for several decades. The land was not cleared by the landowner and nor was the regeneration areas an offset to any clearing that was required to facilitate the Extractive Industry. Indeed no clearing of land was required in respect of the Extractive Industry;
- b. The offer to regenerate / rehabilitate the subject lands (approximate total of 15ha) was precipitated by the landowner through the development consent process. It was not required by either Tweed Shire Council or the Department of Planning. Rather, the land was offered up by the landowner who has a long established desire to sustainably manage the Dunloe Park area; and
- c. The Development Consent issued by the Department of Planning allowed for the staged regeneration of the selected areas. In contrast, the landowner immediately (post issue of consent) fenced all suggested regeneration areas (the total 15ha) to allow for a combination of assisted and natural regeneration.

The approved rehabilitation / regeneration plan is quite specific in recommending the staged regeneration, with a focus on natural regeneration coupled with an adaptive planting and management strategy in response to natural regenerative capacity. This strategy did not and does not call for widespread immediate assisted / mass planting as this is in conflict with both best practice and the need to ensure that through monitoring, that the right species are located in the right areas.

We have been engaged by the proponent to review and monitor these areas for some time and confirm that the upfront measures of immediately fencing and excluding stock from the entire 15ha has resulted in considerable success and establishment of strong and sustainable vegetated areas.

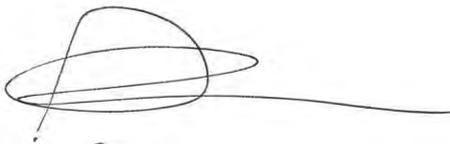
Indeed, the success of these measures has been somewhat remarkable. In this regard, the following additional comments are made:-

- a. All areas have displayed natural resilience with evidence of natural regeneration and no immediate requirements for additional assisted regeneration / supplementary plantings;
- b. There is a diverse assemblage of native species diversity including across all strata i.e groundcovers, shrubs and tree layer;
- c. A mosaic landscape is developing characteristic of two (2) endangered ecosystems which have a limited distribution within the Tweed Shire Area :-
Freshwater wetlands on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions occurs within Area 1 A and 2 B; and
Swamp sclerophyll forest on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner occurs within Area 1 A – c and Area 2 A and C.
- d. The regeneration provides habitat and forage areas for common and scheduled threatened species;
- e. The regeneration includes recognised Koala food trees as identified in the SEPP 44 Schedule 2.
- f. Koala have been observed within the regeneration area 1B (refer attached Images);
- g. There are no areas of significant weed growth or infestation;
- h. Inspections of the site have revealed the presence of a number of species in the regeneration area, including Koalas (observed within eucalypts within the regeneration area).
- i. Significantly the regeneration has strengthened existing remnant vegetation through reduced edge effects; and
- j. The regeneration has strengthened and /or provided wildlife corridors within and external to the site.

Please note we will continue to monitor the success of the rehabilitation and regeneration of the site and trust that the above information is of assistance in addressing the committee's queries.

Please do not hesitate to contact me should you require any further or additional information.

Kind regards

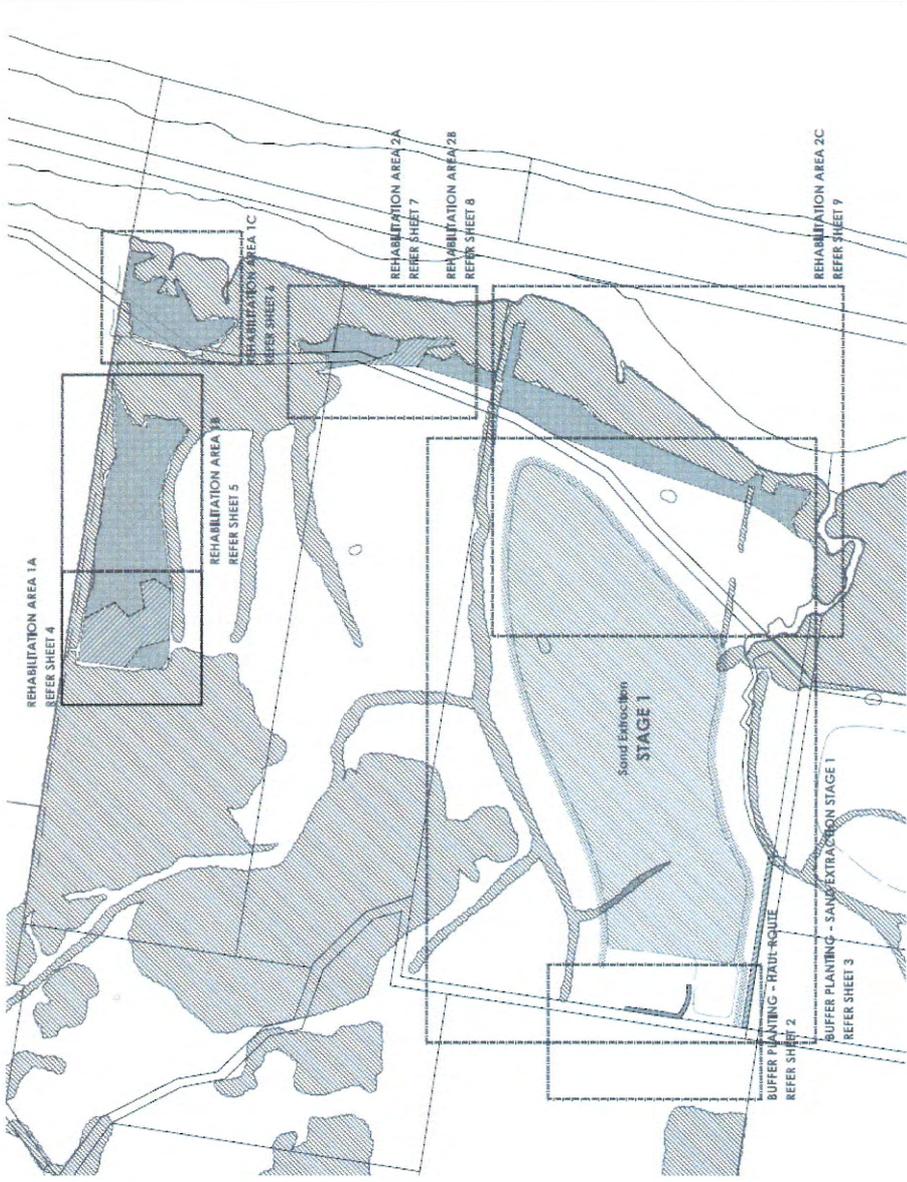
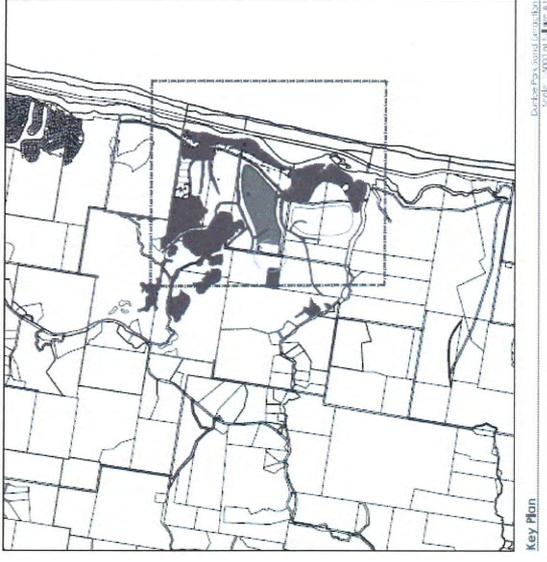


Boyd Sargeant
Director
PLANIT Consulting Pty Ltd

Enc. Site Images

Dunloe Park - Rehabilitation Plan

OPW Landscape Plans



DUNLOE SANDS REHABILITATION / REGENERATION WORKS TYPICAL IMAGES

The rehabilitation / regeneration areas are a mosaic community comprising a number of endangered ecological communities' characteristic of Freshwater wetlands on coastal floodplains and Swamp Sclerophyll Forest on Coastal Floodplains. Koala use within the subject area has been recorded including direct observation.