

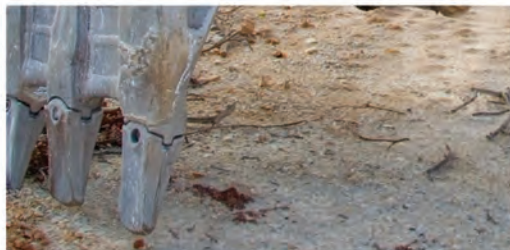
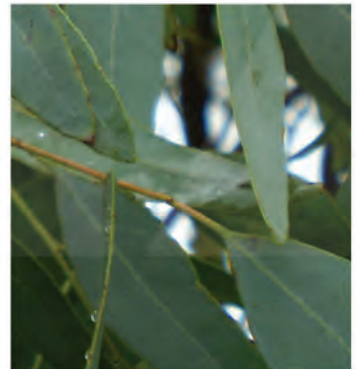
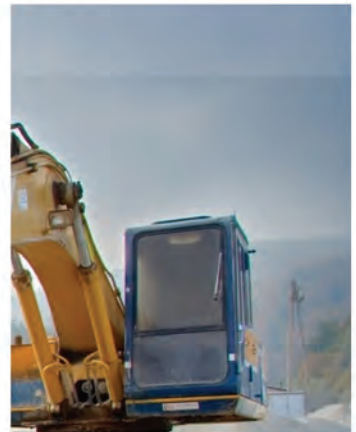


CONSULTING

# DUNLOE SANDS QUARRY

Ramtech Pty Ltd  
Pottsville Mooball Rd,  
Pottsville

Environmental Monitoring Report  
May to October 2011



**Review and Amendments Schedule – PLANIT CONSULTING PTY LTD**

		Date
Author	BL	November 2011
Reviewer	AS	November 2011

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.

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**November 2011**

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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 DOP which integrates the prescribed environmental monitoring programs in accordance with Condition 2 of Schedule 5 into a planning and operations framework.

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 report is to be submitted to the Director General of the Department of Planning and other relevant agencies in accordance with the abovementioned Condition 5 (the Development Consent is presented within Appendix A). The AEMR will describe works undertaken, provide a summary and analysis of any complaints and monitoring results, identify any trends in monitoring results and identify any non compliance over the preceding 12 months. An outline of any actions that were or are proposed to be undertaken to ensure compliance will be included. The AEMR will also identify the proposed construction, extraction and rehabilitation activities planned for the following 12 months.

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.

## 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 <sup>3</sup>	Sand Mm <sup>3</sup>	Total Mm <sup>3</sup>
North Pit	0.14	3.70	3.84
South Pit	0.08	2.96	3.04
<b>Total</b>	<b>0.22</b>	<b>6.66</b>	<b>6.88</b>

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.

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

- Algae Level results for May 2011 to October 2011;
- Ground Water chemical results for May 2011 to October 2011;
- Surface Water chemical results for June and September 2011; and
- Rainfall levels from May 2011 to October 2011.

Water samples for algae were collected monthly between May and October 2011 at the Lake site number 1. Mixed Algae results from all water samples remained steady with less than 100cells/mL. These results are significantly less than the maximum allowable water quality objective of 50,000cells/mL.

Groundwater was sampled monthly over a 6-month period between May and October 2011. Monthly monitoring provided levels of pH, Electrical Conductivity (EC), Redox Potential and Dissolved Oxygen (DO) from locations DLP1 to DLP11. The pH level across the site varied however the majority of the samples maintained within the pH interim target range presented within the Environmental Management Plan. The

EC levels were all below the interim target apart from location DLP3. DO levels vary over the site and months however the majority of samples provide levels above the minimum interim target. The monitoring is ongoing and samples on-site water for levels of Chloride, Calcium, Magnesium, Sodium, Potassium, Sulphate, Arsenic, Iron and Manganese. Groundwater sampling locations as approved by the DOP are contained at **Appendix A**.

Surface water samples were collected for the quarterly sampling event in June and September 2011 at sites SW1 to SW12. Results show generally good quality water with most sites sampled maintaining low EC, suspended solids, phosphorus and nitrogen. pH levels were consistent maintaining levels between the 5.0 – 8.5 levels of the interim target and DO levels were above the interim target. Surface water sampling locations as approved by the DOP are contained at **Appendix B**.

The Bureau of Meteorology (BOM) recorded rainfall within surrounding suburbs over the five month period from May to October 2011. The recorded rainfall averaged from three sites – Coolangatta, Murwillumbah and Byron Bay – was approximately 501mm over the six month period.

### **Complaints Recorded**

No complaints have been registered by the proponents to date.

## 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 to DLP11. Sites locations are shown on the Ground Water Location Map under **Appendix A**.

Surface water analysis includes pH, conductivity, DO, suspended solids, total phosphorus and total nitrogen is conducted quarterly at sites SW1 to SW12. 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 Groundwater Depth

Date	DLP1	DLP1A	DLP2	DLP3	DLP3A	DLP4	DLP5	DLP6
30/08/2004	0.30	0.26	0.23	0.31	0.21	0.29	0.33	0.33
06/09/2004	0.25	0.25	0.20	0.25	0.30	0.29	0.29	0.33
13/09/2004	0.28	0.23	0.18	0.13	0.30	0.28	0.21	0.34
17/12/2004	0.83	0.99	1.25	0.45	0.72	1.37	0.75	1.19

Date	DLP7	DLP7A	DLP8	DLP8A	DLP9	DLP10	DLP10A	DLP11
30/08/2004	0.29	0.23	0.43	0.41	0.31	0.42	0.24	0.24
06/09/2004	0.27	0.23	0.42	0.40	0.29	0.38	0.25	0.23
13/09/2004	0.25	0.21	0.38	0.37	--	0.37	0.24	0.21
17/12/2004	1.09	0.79	1.16	1.28	0.53	1.31	1.36	0.80

Ground water boreholes (Depth) October 2011										
DLP1	DLP2	DLP3	DLP4	DLP5	DLP6	DLP7	DLP8	DLP9	DLP10	DLP11
0.63	0.61	0.57	0.58	0.67	0.59	0.61	0.61	0.57	0.56	0.58

As referenced in the current and reference (background) levels above, the groundwater depth has stayed quite uniform across the site, with no marked difference detected relative to proximity to the Extraction Lake or operational area.

## 2.2 Mixed Algae Results

The results of the mixed algae monitoring for the period of May to October 2011 are displayed within **Table 1**. Results are presented in cells/mL.

**Table 1: Dunloe Sands – Lake - Mixed Algae Results May to October 2011**

	23/05/2011	27/06/2011	28/07/2011	31/08/2011	30/09/2011	27/10/2011
<b>Mixed Algae (cells/mL)</b>	<100	<100	<100	<100	<100	<100

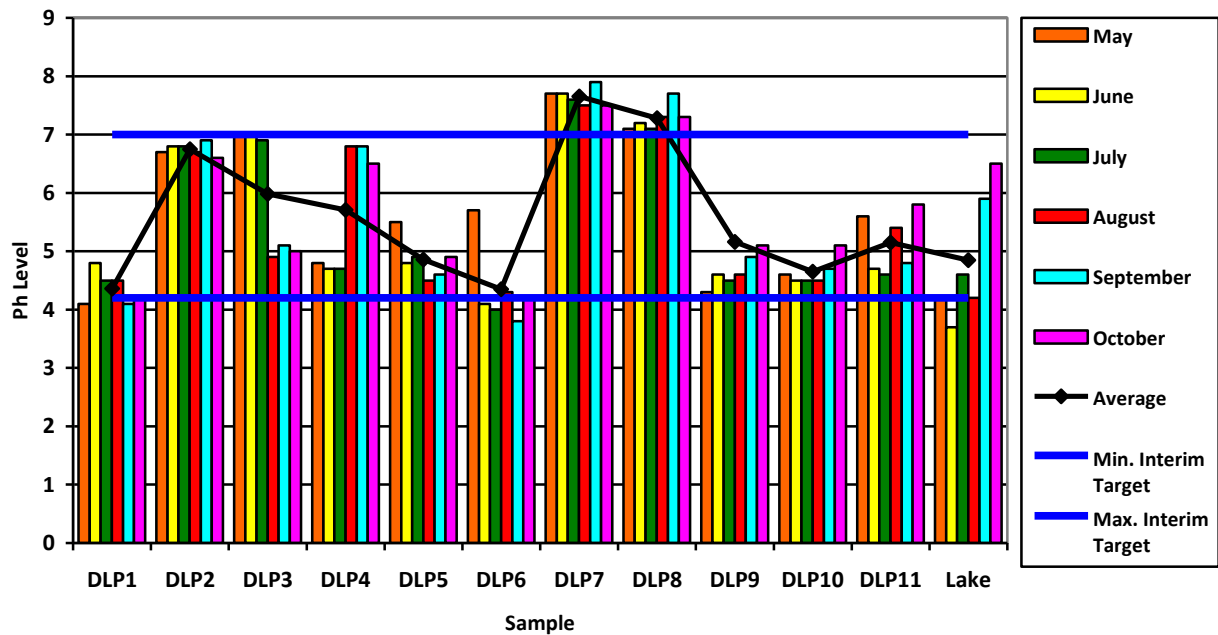
The results gathered between May and October 2011 remain consistently low, with less than 100cell/mL. These results are well below the maximum water quality objectives presented within the EMP of 50,000cells/ML.

## 2.3 Ground Water & Lake Results

Monthly ground water monitoring was conducted between May and October 2011. Samples monitored the pH, EC, Redox Potential and DO levels of twelve sample sites; including eleven ground water and one lake sample site. 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 six month monitoring period. **Figure 2** depicts the pH test results, **Figure 3** illustrates the EC, **Figure 4** shows the Redox Potential and **Figure 5** presents DO levels.

### Ph Sampling - May to October 2011

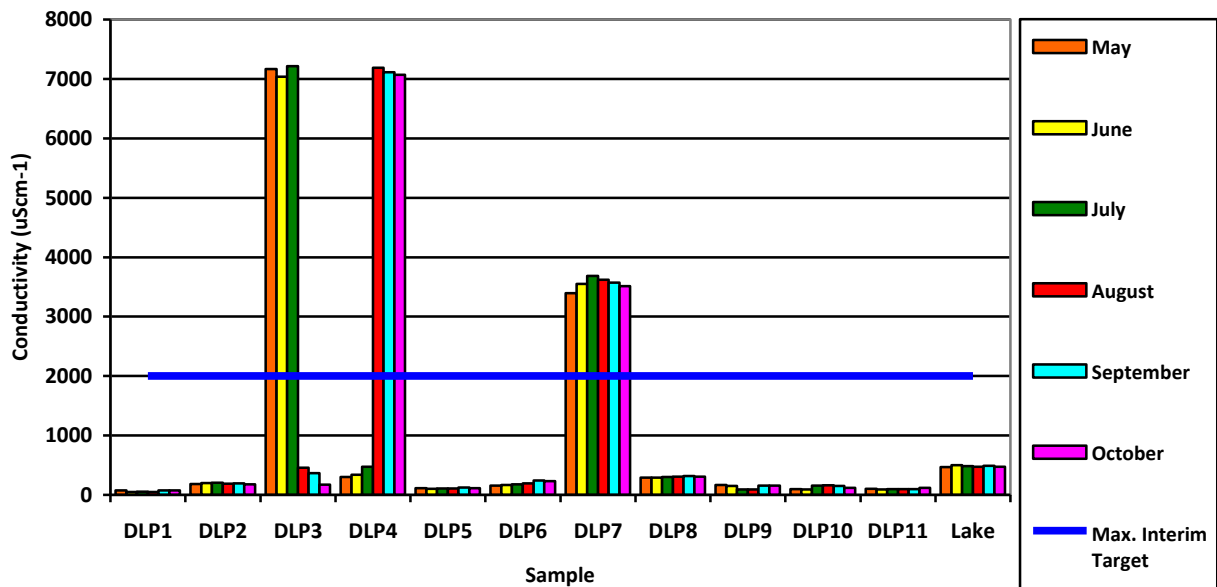


**Figure 1: Dunloe Sands - Ground Water - Chemical (pH Test) Results May to October 2011**

The EMP provided 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.

DLP 7 samples outside the maximum interim target levels by between .5 and .9pH. This presents a lower, more alkaline, pH level than the target range. DLP 8 also sampled above the target level during the 6 month period with variations of .1pH to .7pH. Acidic groundwater pH levels are linked to areas of high rainfall and the exceedances of pH at DLP7 and 8 is not unexpected given that the peak pH levels for both sites were recorded in months of relatively low rainfall (May, June and September).

### Groundwater Electroconductivity - May to October 2011

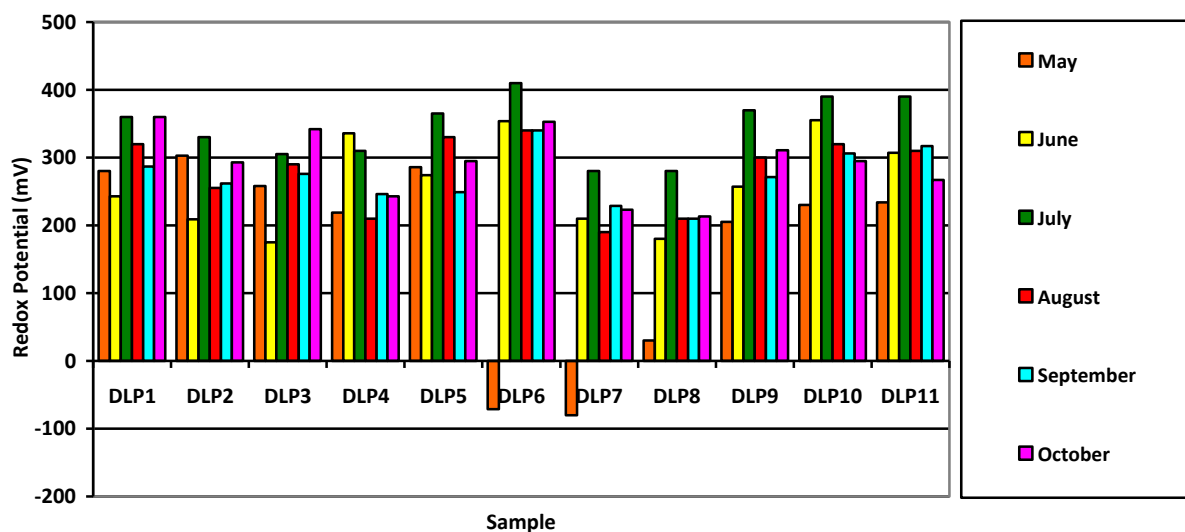


**Figure 2: Dunloe Sands - Ground Water - Chemical (EC Test) Results May to October 2011**

The majority of the samples taken produce considerably low EC levels when compared to the EMP maximum interim target.

Three samples sites; DLP3, DLP4 and DLP7 present conductivity levels well above the maximum interim target of 2,000uS/cm<sup>-1</sup> stated within the EMP, each of which 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 groundwaters has occurred within the vicinity of monitoring locations DLP3, DLP4 and DLP7.

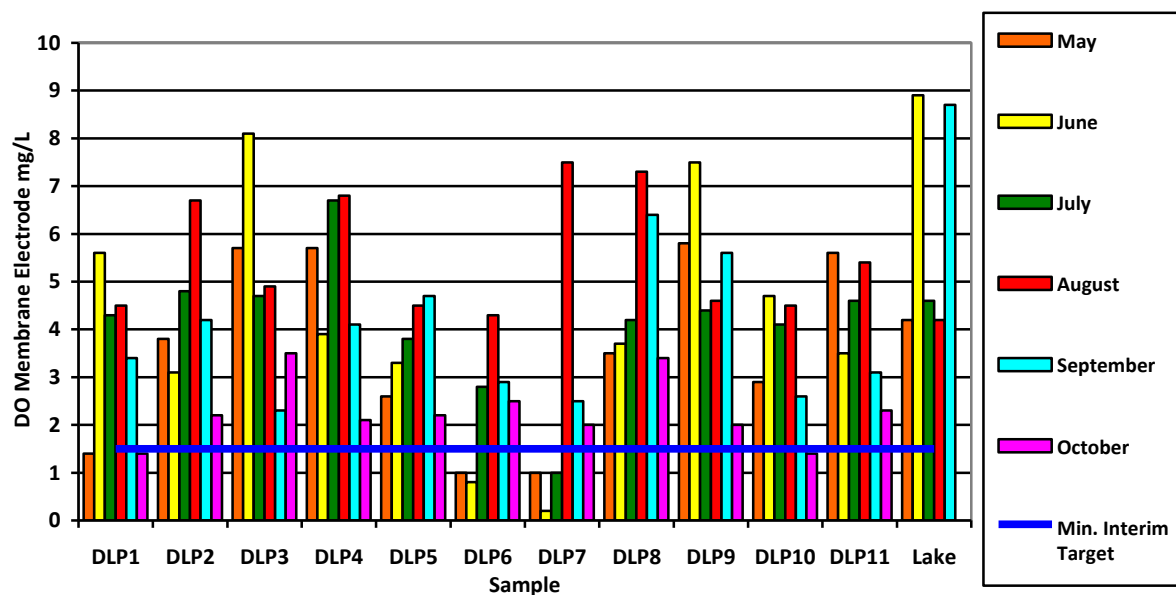
### Groundwater Redox Potential - May to October 2011



**Figure 3: Dunloe Sands - Ground Water - Chemical (Redox Potential Test) Results May to October 2011**

The EMP does not provide an exact interim target level for Redox Potential but instead states 'MAXIMUM'. The results are split with half the locations (generally locations DLP 1 to DLP 5) presenting a high-low-high Redox Potential rate and the locations DLP 6, DLP 9, DLP 10 and DLP 11 producing a low-high-low Redox Potential rate. DLP 6 and 7 depict extremely low Redox Potential levels of -71 and 80 in May that increases rather rapidly to +345 and +210 during June. These extreme changes are difficult to explain but are likely to be related to the decomposition of sub surface organic matter given the location immediately proximate to the adjacent wetland.

### Groundwater Dissolved Oxygen Test Results - May to October 2011



**Figure 4: Dunloe Sands - Ground Water - Chemical (DO Test) Results May to October 2011**

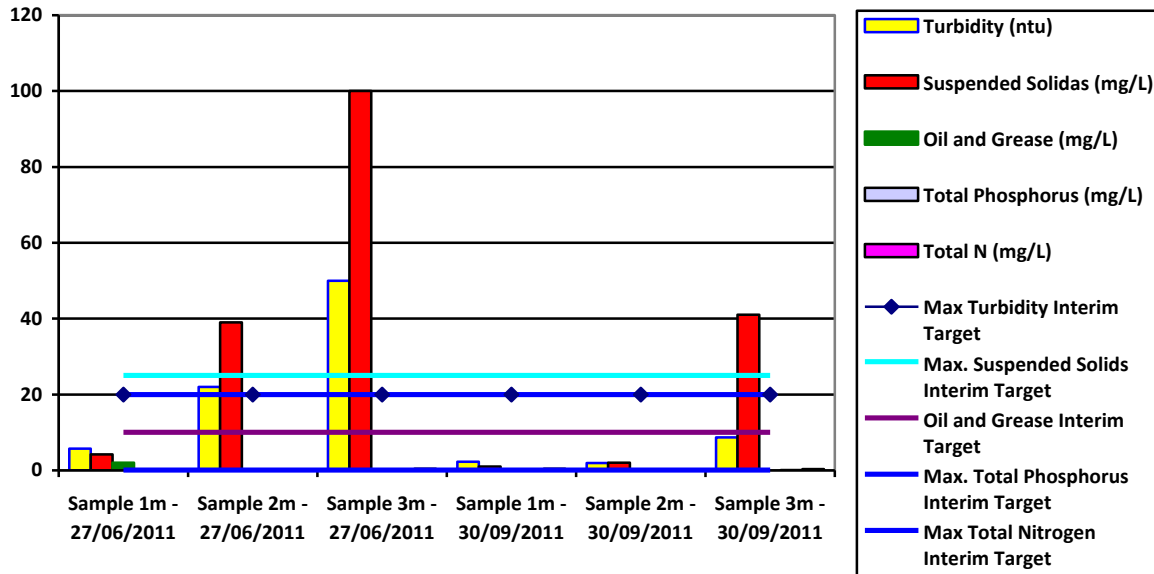
The minimum DO level provided within the EMP is 1.5mg/mL. The results vary in DO levels considerably with the majority not presenting or conforming to a pattern over the six month monitoring period.

The majority of the groundwater samples that were collected are above the minimum interim target however nine (9) samples collected from varied locations present levels below the target. The lake sample presents the highest levels and remains above 8.5mg/MI.

Whilst background testing indicated generally low DO levels inherently across the site, the results for DLP 6 and 7 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. Each of these potential reasons should be considered in the context of future sample results so as to look towards potential ameliorative measures.

Results for tests of turbidity, suspended solids, oil and grease, total phosphorus and total nitrogen were only collected within the lake sample site. **Figure 6** presents the sample levels compared to the EMP interim target levels.

### Chemical Results - Lake Samples - June and September 2011



**Figure 5: Dunloe Sands - Lake - Chemical Results June and September 2011**

Interim target levels for turbidity present a maximum level of 20ntu within the EMP. The levels recorded over the six month monitoring period show levels above the maximum during June however levels are decreased to below maximum levels during the September monitoring. This could be generally explained by the higher level of rainfall experienced in June in comparison to that of the September rainfall. However it also warrants further consideration into the effectiveness of surface water containment measures. The surface water inflows must not flow into the lake from external sources (inclusive of the plant area) as this heightens the turbidity levels that are sampled.

The maximum interim target level for the suspended solids within the EMP is 25mg/L. Results present a level above the maximum from the 2 and 3m samples during June and September. The 2m sample falls back beneath the level in the September sample but the 3m sample still exceeds.. Again this result is likely due to the high rainfall experienced in June when related to the low levels experienced during September. It should be noted that generally a maximum level of 50 ntu is applied to discharge levels from development sites, indicating that generally levels are and remain quite low across the site.

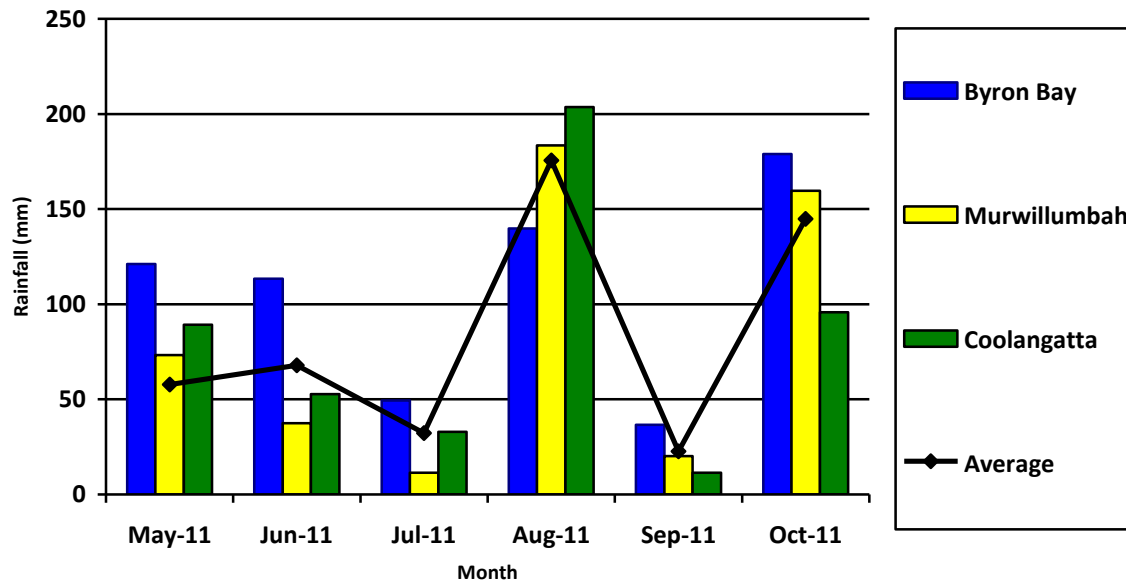
The EMP states a maximum level of 10mg/L in regard to oil and grease. Levels of oil and grease within the samples are consistent over the six month monitoring period at 2mg/L.

Total phosphorus levels have been sampled and are all 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 0.43mg/L.

## 2.4 Recorded Rainfall

The BOM have recorded rainfall within the surrounding areas of Pottsville; including Coolangatta (24.3km from Pottsville), Murwillumbah – Bray Park (18.9km from Pottsville) and Byron Bay (28.5km from Pottsville). The results are illustrated within **Figure 7** along with the recorded rainfall average.

**Rainfall - May to October 2011**



**Figure 6: Recorded Rainfall May to October 2011**

The recorded rainfall of the three suburbs surrounding Pottsville has been averaged to produce an approximate on-site rainfall. August and October 2011 presented a high level of rainfall within the region with averages of 175.6mm and 144.8mm of rain being recorded respectively. In total over the six month period approximately 501mm of rain was recorded on-site.



## Chapter 3.0 Quarterly Monitoring Results



### 3.1 Ground Water Results

Quarterly monitoring of the ground waters on-site within locations DLP 1 to DLP 11 and the Lake sample water 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 June and September 2011. 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)**

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	6.0	18.0	<b>2,250.0</b>	92.0	15	16.0
Interim Target	285.0	285.0	285.0	285.0	285.0	285.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
<b>550.0</b>	20.0	16.0	14.0	15.0	19.0	
285.0	285.0	285.0	285.0	285.0	285.0	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	9.0	18.0	88.0	<b>2250.0</b>	17.0	15.0
Interim Target	285.0	285.0	285.0	285.0	285.0	285.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
<b>630.0</b>	22.0	12.0	18.0	18.0	23.0	
285.0	285.0	285.0	285.0	285.0	285.0	

Comments: As highlighted previously, three samples sites (DLP3, DLP4 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm<sup>-1</sup> 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 groundwaters has occurred within the vicinity of DLP3, DLP4 & DLP7 due to tidal influences within these nearby waterways and wetlands.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	0.4	8.2	75.0	2.2	0.9	1.9
Interim Target	55.0	55.0	55.0	55.0	55.0	55.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
13.0	37.0	6.6	1.3	1.5	48.0	
55.0	55.0	55.0	55.0	55.0	55.0	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	0.4	10.0	0.8	86.0	1.4	3.6
Interim Target	55.0	55.0	55.0	55.0	55.0	55.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
21.0	54.0	1.5	7.5	1.6	76.0	
55.0	55.0	55.0	55.0	55.0	55.0	

NB. Major cation

Comments: The spike associated with DLP3, DLP4 and the Lake samples are consistent with background testing and consistent with the sites location proximate to the adjacent tidal waterway.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	0.4	7.6	109.0	3.6	1.4	3.6
Interim Target	40.0	40.0	40.0	40.0	40.0	40.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
25.0	2.9	3.4	0.7	1.6	4.5	
40.0	40.0	40.0	40.0	40.0	40.0	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	0.3	10.0	2.2	142.0	2.6	7.8
Interim Target	40.0	40.0	40.0	40.0	40.0	40.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	

<b>45.0</b>	4.1	0.6	4.6	2.1	6.2
40.0	40.0	40.0	40.0	40.0	40.0

NB. Major cation

Comments: The spike associated with DLP3 and DLP7 is consistent with background testing and consistent with the sites location proximate to the adjacent tidal waterway.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	5.0	17.0	<b>990.0</b>	49.0	9.0	9.9
Interim Target	280.0	280.0	280.0	280.0	280.0	280.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
<b>368.0</b>	12.0	9.1	8.5	8.6	12.0	
280.0	280.0	280.0	280.0	280.0	280.0	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	6.3	23.0	85.0	<b>1526.0</b>	18.0	21.0
Interim Target	280.0	280.0	280.0	280.0	280.0	280.0
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
<b>790.0</b>	20.0	11.0	13.0	13.0	19.0	
280.0	280.0	280.0	280.0	280.0	280.0	

NB. Major cation

Comments: As highlighted previously, three samples sites (DLP3, DLP4 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm<sup>-1</sup> 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 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 groundwaters has occurred within the vicinity of DLP3, DLP4 & DLP7 due to tidal influences within these nearby waterways and wetlands.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 5.0	< 5.0	40.0	< 5.0	< 5.0	< 5.0
Interim Target	17.5	17.5	17.5	17.5	17.5	17.5
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
29.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	
17.5	17.5	17.5	17.5	17.5	17.5	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 5.0	< 5.0	< 5.0	66.0	< 5.0	< 5.0
Interim Target	17.5	17.5	17.5	17.5	17.5	17.5
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
42.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	
17.5	17.5	17.5	17.5	17.5	17.5	

NB. Major cation

Comments: As highlighted previously, three samples sites (DLP3, DLP4 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm<sup>-1</sup> 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 groundwaters has occurred within the vicinity of DLP3, DLP4 & DLP7 due to tidal influences within these nearby waterways and wetlands

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	4.1	12.0	126.0	21.0	15.0	36.0
Interim Target	175	175	175	175	175	175
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
110.0	4.0	31.0	11.0	10.0	158.0	
175	175	175	175	175	175	

September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	70	204.0	10.0	12.0	34.0	70.0
Interim Target	175	175	175	175	175	175
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
204.0	10.0	12.0	34.0	10.0	209.0	
175	175	175	175	175	175	

Comments: Minor exceedances were experienced during the September sampling at DLP 2, DLP 7 and the Lake sample site. These wells are located near the stockpile and plant. It is recommended that this be monitored for stability over the next testing period to determine if there are interactive causes between the plant area, lake and the readings above.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 0.005	< 0.005	< 0.005	< 0.005	-	< 0.005
Interim Target	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Interim Target	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	
< 0.005	< 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)**

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	1.16	1.31	0.17	1.01	2.04	3.18
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
0.07	0.35	<b>8.80</b>	1.99	<b>12.0</b>	1.40	
< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	2.36	4.28	0.97	0.30	2.56	<b>9.20</b>
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
0.21	0.33	<b>14.0</b>	<b>9.73</b>	<b>7.92</b>	0.19	
< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	

Comments: Minor exceedances of the target iron levels are noted at DLP 6, DLP 9, DLP 10 and DLP 11. Further monitoring is recommended however no action is considered necessary at this point given the minor nature of the spike.

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

June 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 0.01	< 0.01	<b>0.55</b>	< 0.01	< 0.01	0.01
Interim Target	0.15	0.15	0.15	0.15	0.15	0.15
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
0.07	< 0.01	0.13	< 0.01	0.01	<b>0.28</b>	
0.15	0.15	0.15	0.15	0.15	0.15	
September 2011	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6
Sample	< 0.01	< 0.01	< 0.01	<b>0.62</b>	< 0.01	0.01
Interim Target	0.15	0.15	0.15	0.15	0.15	0.15
DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake	
0.05	< 0.01	< 0.01	0.11	< 0.01	<b>0.22</b>	

0.15	0.15	0.15	0.15	0.15	0.15
------	------	------	------	------	------

Comments: Manganese is typically associated brackish or slightly saline conditions and therefore the readings at DLP3, DLP4 and the Lake sample are entirely expected and consistent with background.



### 3.2 Surface Water Results

Quarterly monitoring of the surface waters on site within locations SW 1 to SW 12 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 June and September 2011. 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)**

<b>June 2011</b>	<b>SW 1</b>	<b>SW 2</b>	<b>SW 3</b>	<b>SW 4</b>	<b>SW 5</b>	<b>SW 6</b>
<b>Sample</b>	6.9	7.2	5.9	6.4	6.5	7.3
<b>Interim Target</b>	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
<b>SW 7</b>	<b>SW 8</b>	<b>SW 9</b>	<b>SW 10</b>	<b>SW 11</b>	<b>SW 12</b>	
6.4	6.0	6.7	5.7	-	6.0	
5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	
<b>September 2011</b>	<b>SW 1</b>	<b>SW 2</b>	<b>SW 3</b>	<b>SW 4</b>	<b>SW 5</b>	<b>SW 6</b>
<b>Sample</b>	7.3	6.9	6.6	6.9	6.9	6.9
<b>Interim Target</b>	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5
<b>SW 7</b>	<b>SW 8</b>	<b>SW 9</b>	<b>SW 10</b>	<b>SW 11</b>	<b>SW 12</b>	
6.7	6.6	6.3	6.4	-	6.5	
5 – 8.5	5 – 8.5	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/cm<sup>-1</sup>)**

<b>June 2011</b>	<b>SW 1</b>	<b>SW 2</b>	<b>SW 3</b>	<b>SW 4</b>	<b>SW 5</b>	<b>SW 6</b>
<b>Sample</b>	1,727	2,760	638	2,206	2,988	2,307
<b>Interim Target</b>	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500
<b>SW 7</b>	<b>SW 8</b>	<b>SW 9</b>	<b>SW 10</b>	<b>SW 11</b>	<b>SW 12</b>	
2,212	638	2,349	591	-	471	
< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	

September 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	10,196	15,752	10,416	15,566	15,562	15,516
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
15,585	4,593	15,014	12,647	-	7,968	
< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	

Comments: The June sampling provided figures that comply with the interim target of EC for the site pursuant to the EMP. However, all but one of the samples during the September sampling exceeded the interim targets by as much as three times. As the site is affected by tidal movements, an explanation for this vast increase in the EC of the surface water could be explained by the sampling being carried out on the full tide. EC levels increase with the presence of salt within surface water and the full tide would have increased the surface water samples salt content. As evidence that the Sand Quarry operations are not the cause of this increase can be seen in the Lake Samples for September (**Appendix C**). All samples are below the interim target levels and therefore any leaching or intrusion into the sample sites would not result in such high readings. Further monitoring is recommended to ensure that the EC levels revert back to within the interim targets and that testing is only carried out on a low tide.

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

June 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	9.3	10	7.7	8.1	8.7	10
Interim Target	> 4	> 4	> 4	> 4	> 4	> 4
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
8.5	7.6	7.0	5.1	-	8.4	
> 4	> 4	> 4	> 4	> 4	> 4	
September 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	7.0	7.0	6.3	7.6	7.1	6.4
Interim Target	> 4	> 4	> 4	> 4	> 4	> 4
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
6.3	6.9	6.1	6.2	-	6.7	
> 4	> 4	> 4	> 4	> 4	> 4	

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

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

June 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	8.2	7.0	11.0	7.6	4.8	5.3
Interim Target	< 25	< 25	< 25	< 25	< 25	< 25
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
12.0	9.0	9.7	9.5	-	5.6	
< 25	< 25	< 25	< 25	< 25	< 25	
September 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	7.8	11.0	16.0	4.8	5.0	11.0
Interim Target	< 25	< 25	< 25	< 25	< 25	< 25
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
22.0	5.7	53.0	11.0	-	10.0	
< 25	< 25	< 25	< 25	< 25	< 25	

Comment: The increased suspended solids reading at SW 9 during September is an outlier sample. It is recommended that this surface water site is monitored in addition to the function of the flood gates that are upstream of the site.

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

June 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	< 0.05	0.07	< 0.05	< 0.05	< 0.05	0.06
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
SW 7	SW 8	SW 9	SW 10	SW 11	SW 12	
< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05	
< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	
September 2011	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
Sample	< 0.05	0.07	< 0.05	< 0.05	< 0.05	0.06
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08

SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
< 0.05	< 0.05	< 0.05	< 0.05	-	< 0.05
< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08

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

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

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
<b>Sample</b>	0.40	0.34	0.91	0.64	0.58	0.30
<b>Interim Target</b>	< 20	< 20	< 20	< 20	< 20	< 20
<b>SW 7</b>	<b>SW 8</b>	<b>SW 9</b>	<b>SW 10</b>	<b>SW 11</b>	<b>SW 12</b>	
0.80	0.93	0.38	0.40	-	0.73	
< 20	< 20	< 20	< 20	< 20	< 20	
	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6
<b>Sample</b>	0.47	0.48	0.66	0.34	0.37	0.44
<b>Interim Target</b>	< 20	< 20	< 20	< 20	< 20	< 20
<b>SW 7</b>	<b>SW 8</b>	<b>SW 9</b>	<b>SW 10</b>	<b>SW 11</b>	<b>SW 12</b>	
0.55	0.57	0.82	0.58	-	0.45	
< 20	< 20	< 20	< 20	< 20	< 20	

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

## 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.

Adam Smith  
**Director**  
**Planit Consulting**

November 2011

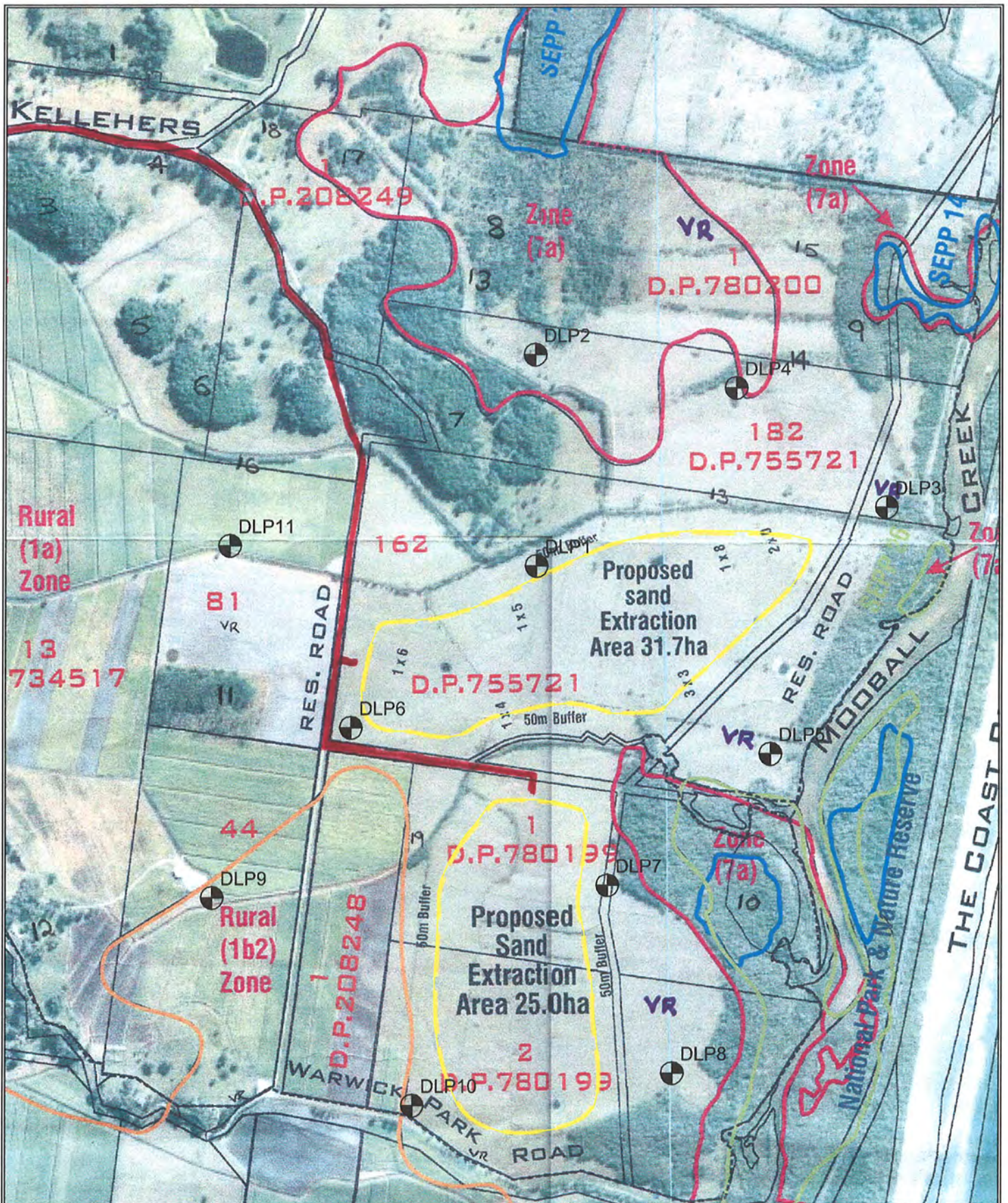
Steve Petersen  
**Director**  
**RAMTECH**

November 2011

## Appendix A Ground Water Location Map







**Gilbert & Sutherland**  
Specialist Soil and Water Scientists

Suite 12, Riverwalk One  
140 Robina Town Centre Drive  
Phone 55789944 Fax 55789945



PROJECT

**RAMTECH PTY LTD**  
**DUNLOE PARK, MOOBALL**  
**GROUNDWATER BORE LOCATIONS**

Image source: N.C. White & Associates

FIGURED DIMENSIONS TO  
BE READ IN PREFERENCE  
TO SCALING.

APPROVED

SCALE AS SHOWN

DRAWN C.M.A.

DRAWING No.

DATE 14/09/04

CHECKED

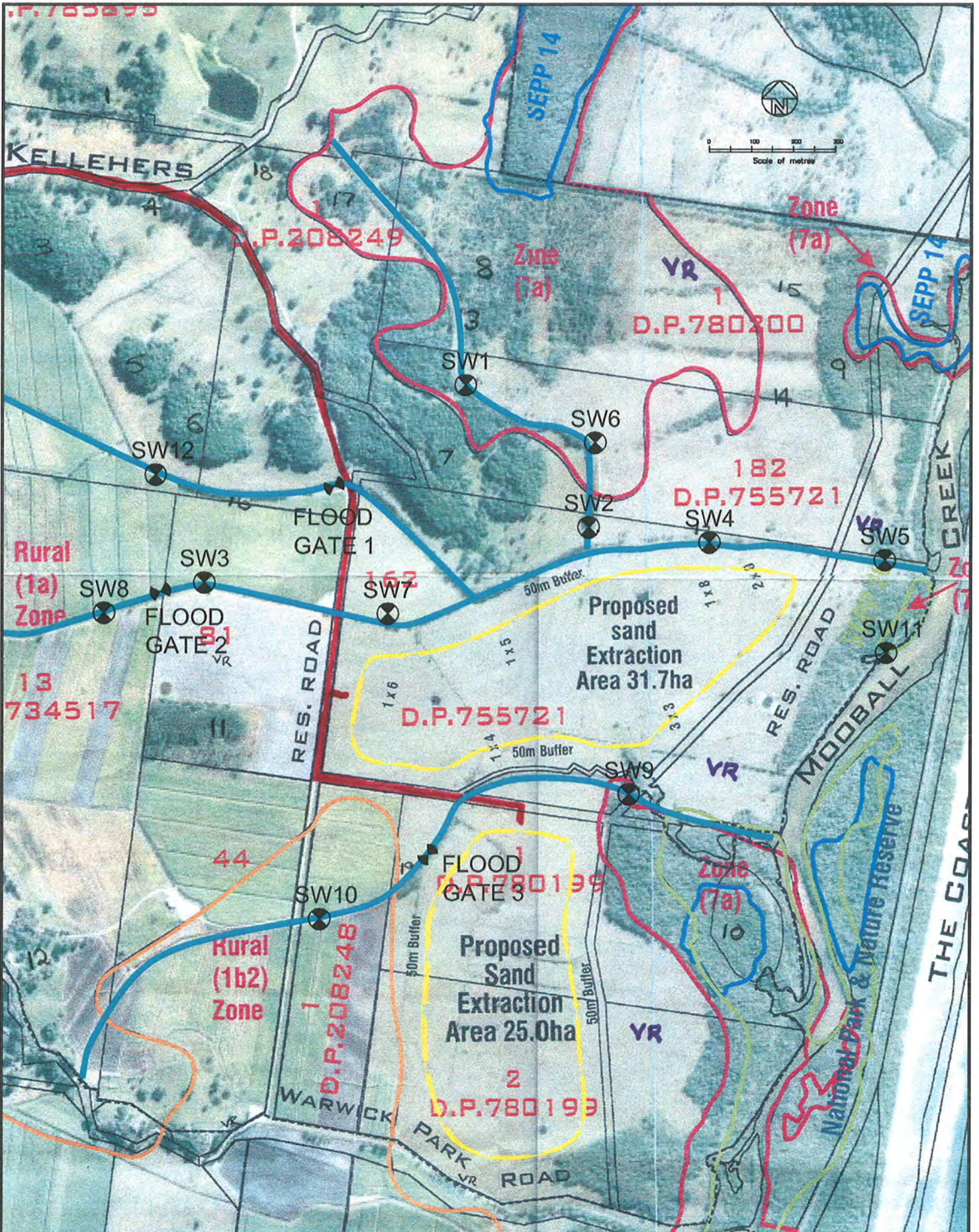
GJ0400.8.1



## Appendix B Surface Water Location Map







- AGRICULTURAL DRAINS
- SURFACE WATER MONITORING LOCATIONS
- FLOOD GATE

**Gilbert & Sutherland**  
Specialist Soil and Water Scientists



Suite 12, Riverwalk One  
140 Robina Town Centre Drive  
Phone 55789944 Fax 55789945

PROJECT  
RAMTECH PTY LTD  
DUNLOE PARK, MOOBALL  
SURFACE WATER MONITORING AND FLOOD GATE LOCATIONS  
Image source: N.C. White & Associates

FIGURED DIMENSIONS TO BE READ IN PREFERENCE TO SCALING.

APPROVED

SCALE AS SHOWN

DRAWN J.J.T.

DRAWING No.

DATE 10/02/05

CHECKED

GJ0400.9.2



## Appendix C Sampling Raw Data



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## FINAL CERTIFICATE OF ANALYSIS

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

Page 1 of 4

**Attention:** Steve Peterson  
**Copy To:** Fax: 02 6672 3896

**Lims1 Report No:** 11/1483-C  
**Client Reference:**  
**Date of Report:** 03/06/2011

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**Taken By:** Client  
**Date Taken:** 23/05/2011  
**Date Received:** 23/05/2011

**No of Samples:** 12  
**Date Testing Commenced:** 23/05/2011  
**Date Testing Completed:** 03/06/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample



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Accreditation No: 12754 & 13538

  
Dr Paul J Wright  
(Laboratory Coordinator)  
[paulw@tweed.nsw.gov.au](mailto:paulw@tweed.nsw.gov.au)

## Tweed Laboratory Centre

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MURWILLUMBAH  
NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1483-C  
**Date Testing Completed:** 03/06/2011  
**Date of Report:** 03/06/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

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 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1483-C  
**Date Testing Completed:** 03/06/2011  
**Date of Report:** 03/06/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Date Received:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Date Testing Commenced:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Test	Method	Units	11/1483-C-1	11/1483-C-2	11/1483-C-3	11/1483-C-4	11/1483-C-5
pH	P1	pH units	4.1	6.7	7.0	4.8	5.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	74	183	7,166	301	114
DO (membrane electrode)	P12	mg/L	1.4	3.8	5.7	5.7	2.6
*Redox Potential	P16	mV	+280	+303	258	219	286
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Date Received:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Date Testing Commenced:			23/05/2011	23/05/2011	23/05/2011	23/05/2011	23/05/2011
Test	Method	Units	11/1483-C-6	11/1483-C-7	11/1483-C-8	11/1483-C-9	11/1483-C-10
pH	P1	pH units	5.7	7.7	7.1	4.3	4.6
Conductivity	P2	$\mu\text{Scm}^{-1}$	156	3,395	292	165	99
DO (membrane electrode)	P12	mg/L	<1.0	<1.0	3.5	5.8	2.9
*Redox Potential	P16	mV	-71	-80	+30	+205	+230
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

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 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1483-C  
**Date Testing Completed:** 03/06/2011  
**Date of Report:** 03/06/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			23/05/2011	23/05/2011
Date Received:			23/05/2011	23/05/2011
Date Testing Commenced:			23/05/2011	23/05/2011
Test	Method	Units	11/1483-C-11	11/1483-C-12
pH	P1	pH units	5.6	4.2
Conductivity	P2	$\mu\text{Scm}^{-1}$	102	467
DO (membrane electrode)	P12	mg/L	5.3	8.1
*Redox Potential	P16	mV	+234	--
Turbidity	P8	ntu	--	4.5
Suspended Solids	P4	mg/L	--	1.6
Oil and Grease	C8	mg/L	--	<2
Total Phosphorus-P	C17	mg/L	--	<0.05
Total-N	C7	mg/L	--	0.17



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Page 1 of 8

**Attention:** Steve Peterson  
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**Lims1 Report No:** 11/1798-C  
**Client Reference:**  
**Date of Report:** 11/07/2011

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**Taken By:** Client  
**Date Taken:** 27/06/2011  
**Date Received:** 27/06/2011

**No of Samples:** 25  
**Date Testing Commenced:** 27/06/2011  
**Date Testing Completed:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample - 1 Metre
13	Lake Sample - 2 Metre
14	Lake Sample - 3 Metre
15	SW 1



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Accreditation No: 12754 & 13538

  
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NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
16	SW 2
17	SW 3
18	SW 4
19	SW 5
20	SW 6
21	SW 7
22	SW 8
23	SW 9
24	SW 10
25	SW 12

## Tweed Laboratory Centre

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**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C

**Date Testing Completed:** 11/07/2011

**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

NP = Not Present.

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
 MURWILLUMBAH  
 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Received:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Testing Commenced:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Test	Method	Units	11/1798-C-1	11/1798-C-2	11/1798-C-3	11/1798-C-4	11/1798-C-5
pH	P1	pH units	4.8	6.8	7.0	4.7	4.8
Conductivity	P2	$\mu\text{Scm}^{-1}$	50	198	7,039	341	104
*Redox Potential	P16	mV	+243	+209	+175	+336	+274
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	3	67	310	2	5
Bicarbonate HCO <sub>3</sub>	C10	mg/L	2	41	187	1	3
DO (membrane electrode)	P12	mg/L	5.6	3.1	8.1	3.9	3.3
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--
Chloride	C20	mg/L	6	18	2,250	92	15
Calcium	M8	mg/L	0.4	8.2	75.0	2.2	0.9
Magnesium	M8	mg/L	0.4	7.6	109.0	3.6	1.4
Sodium	M8	mg/L	5.0	17.0	990.0	49.0	9.0
Potassium M8	M8	mg/L	<5.0	<5.0	40.0	<5.0	<5.0
Sulphur as Sulphate	M8	mg/L	4.1	12.0	126.0	21.0	15.0
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	1.16	1.31	0.17	1.01	2.04
Manganese (Total)	M8	mg/L	<0.01	<0.01	0.55	<0.01	<0.01

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
 MURWILLUMBAH  
 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Received:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Testing Commenced:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Test	Method	Units	11/1798-C-6	11/1798-C-7	11/1798-C-8	11/1798-C-9	11/1798-C-10
pH	P1	pH units	4.1	7.7	7.2	4.6	4.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	168	3,553	291	153	92
*Redox Potential	P16	mV	+354	+210	+180	+257	+355
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	<1	970	120	<1	<1
Bicarbonate HCO <sub>3</sub>	C10	mg/L	<1	592	71	<1	<1
DO (membrane electrode)	P12	mg/L	0.8	0.2	3.7	7.5	4.7
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--
Chloride	C20	mg/L	16	550	20	16	14
Calcium	M8	mg/L	1.9	13.0	37.0	6.6	1.3
Magnesium	M8	mg/L	3.6	25.0	2.9	3.4	0.7
Sodium	M8	mg/L	9.9	368.0	12.0	9.1	8.5
Potassium M8	M8	mg/L	<5.0	29.0	<5.0	<5.0	<5.0
Sulphur as Sulphate	M8	mg/L	36.0	110.0	4.0	31.0	11.0
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	3.18	0.07	0.35	8.80	1.99
Manganese (Total)	M8	mg/L	0.01	0.07	<0.01	0.13	<0.01

## Tweed Laboratory Centre

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 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample - 1 Metre	Lake Sample - 2 Metre	Lake Sample - 3 Metre	SW 1
Date Taken:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Received:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Testing Commenced:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Test	Method	Units	11/1798-C-11	11/1798-C-12	11/1798-C-13	11/1798-C-14	11/1798-C-15
pH	P1	pH units	4.7	3.7	3.8	3.8	6.9
Conductivity	P2	$\mu\text{Scm}^{-1}$	92	501	496	496	1,727
*Redox Potential	P16	mV	+307	--	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	2	<1	<1	<1	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	1	<1	<1	<1	--
DO (membrane electrode)	P12	mg/L	3.5	8.9	8.9	8.9	9.3
Turbidity	P8	ntu	--	5.7	22	50	--
Suspended Solids	P4	mg/L	--	4.2	39	100	8.2
Oil and Grease	C8	mg/L	--	<2	--	--	--
Total Phosphorus-P	C17	mg/L	--	<0.05	<0.05	<0.05	<0.05
Total-N	C7	mg/L	--	0.14	0.21	0.43	0.40
Chloride	C20	mg/L	15	19	19	18	--
Calcium	M8	mg/L	1.5	48.0	46.0	46.0	--
Magnesium	M8	mg/L	1.6	4.5	4.4	4.5	--
Sodium	M8	mg/L	8.6	12.0	9.3	11.0	--
Potassium M8	M8	mg/L	<5.0	<5.0	<5.0	<5.0	--
Sulphur as Sulphate	M8	mg/L	10.0	158.0	160.0	159.0	--
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	--
Iron (Total)	M8	mg/L	12.0	1.40	7.16	17.0	--
Manganese (Total)	M8	mg/L	0.01	0.28	0.27	0.27	--

## Tweed Laboratory Centre

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 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 2	SW 3	SW 4	SW 5	SW 6
Date Taken:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Received:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Testing Commenced:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Test	Method	Units	11/1798-C-16	11/1798-C-17	11/1798-C-18	11/1798-C-19	11/1798-C-20
pH	P1	pH units	7.2	5.9	6.4	6.5	7.3
Conductivity	P2	$\mu\text{Scm}^{-1}$	2,760	638	2,206	2,988	2,307
*Redox Potential	P16	mV	--	--	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	10	7.7	8.1	8.7	10
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	7.0	11	7.6	4.8	5.3
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	0.07	<0.05	<0.05	<0.05	0.06
Total-N	C7	mg/L	0.34	0.91	0.64	0.58	0.30
Chloride	C20	mg/L	--	--	--	--	--
Calcium	M8	mg/L	--	--	--	--	--
Magnesium	M8	mg/L	--	--	--	--	--
Sodium	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	--	--	--	--	--

## Tweed Laboratory Centre

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 NSW 2484  
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**Lims1 Report No:** 11/1798-C  
**Date Testing Completed:** 11/07/2011  
**Date of Report:** 11/07/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 7	SW 8	SW 9	SW 10	SW 12
Date Taken:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Received:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Date Testing Commenced:			27/06/2011	27/06/2011	27/06/2011	27/06/2011	27/06/2011
Test	Method	Units	11/1798-C-21	11/1798-C-22	11/1798-C-23	11/1798-C-24	11/1798-C-25
pH	P1	pH units	6.4	6.0	6.7	5.7	6.0
Conductivity	P2	$\mu\text{Scm}^{-1}$	2,212	638	2,349	591	471
*Redox Potential	P16	mV	--	--	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	8.5	7.6	7.0	5.1	8.4
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	12	9.0	9.7	9.5	5.6
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Total-N	C7	mg/L	0.80	0.93	0.38	0.40	0.73
Chloride	C20	mg/L	--	--	--	--	--
Calcium	M8	mg/L	--	--	--	--	--
Magnesium	M8	mg/L	--	--	--	--	--
Sodium	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	--	--	--	--	--



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](mailto:samlereception@tweed.nsw.gov.au) ABN: 90 178 732 496  
(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)  
[www.tweedlab.com.au](http://www.tweedlab.com.au)

## FINAL CERTIFICATE OF ANALYSIS

**Client:** Ramtech Pty Ltd Page 1 of 4  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

**Attention:** Steve Peterson **Lims1 Report No:** 11/2098-C  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 08/08/2011

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**Taken By:** Client **No of Samples:** 12  
**Date Taken:** 28/07/2011 **Date Testing Commenced:** 29/07/2011  
**Date Received:** 29/07/2011 **Date Testing Completed:** 08/08/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample



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Accreditation No: 12754 & 13538



Tania Collins  
(Instrument Analyst)  
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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2098-C  
**Date Testing Completed:** 08/08/2011  
**Date of Report:** 08/08/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
 MURWILLUMBAH  
 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2098-C  
**Date Testing Completed:** 08/08/2011  
**Date of Report:** 08/08/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			28/07/2011	28/07/2011	28/07/2011	28/07/2011	28/07/2011
Date Received:			29/07/2011	29/07/2011	29/07/2011	29/07/2011	29/07/2011
Date Testing Commenced:			29/07/2011	29/07/2011	29/07/2011	29/07/2011	29/07/2011
Test	Method	Units	11/2098-C-1	11/2098-C-2	11/2098-C-3	11/2098-C-4	11/2098-C-5
pH	P1	pH units	4.5	6.8	6.9	4.7	4.9
Conductivity	P2	$\mu\text{Scm}^{-1}$	54	207	7,213	475	105
DO (membrane electrode)	P12	mg/L	4.3	4.8	4.7	6.7	3.8
*Redox Potential	P16	mV	+360	+330	+305	+310	+365
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			28/07/2011	28/07/2011	28/07/2011	28/07/2011	28/07/2011
Date Received:			29/07/2011	29/07/2011	29/07/2011	29/07/2011	29/07/2011
Date Testing Commenced:			29/07/2011	29/07/2011	29/07/2011	29/07/2011	29/07/2011
Test	Method	Units	11/2098-C-6	11/2098-C-7	11/2098-C-8	11/2098-C-9	11/2098-C-10
pH	P1	pH units	4.0	7.6	7.1	4.5	4.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	176	3,686	302	93	156
DO (membrane electrode)	P12	mg/L	2.8	1	4.2	4.4	4.1
*Redox Potential	P16	mV	+410	+280	+280	+370	+390
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
 MURWILLUMBAH  
 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2098-C  
**Date Testing Completed:** 08/08/2011  
**Date of Report:** 08/08/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			28/07/2011	28/07/2011
Date Received:			29/07/2011	29/07/2011
Date Testing Commenced:			29/07/2011	29/07/2011
Test	Method	Units	11/2098-C-11	11/2098-C-12
pH	P1	pH units	4.6	4.6
Conductivity	P2	$\mu\text{Scm}^{-1}$	95	485
DO (membrane electrode)	P12	mg/L	8.0	8.9
*Redox Potential	P16	mV	+390	--
Turbidity	P8	ntu	--	9.9
Suspended Solids	P4	mg/L	--	14
Oil and Grease	C8	mg/L	--	<2
Total Phosphorus-P	C17	mg/L	--	<0.05
Total-N	C7	mg/L	--	0.16



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](mailto:samlereception@tweed.nsw.gov.au) ABN: 90 178 732 496  
(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)  
[www.tweedlab.com.au](http://www.tweedlab.com.au)

## FINAL CERTIFICATE OF ANALYSIS

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

Page 1 of 4

**Attention:** Steve Peterson  
**Copy To:** Fax: 02 6672 3896

**Lims1 Report No:** 11/2410-C  
**Client Reference:**  
**Date of Report:** 09/09/2011

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**Taken By:** Client  
**Date Taken:** 31/08/2011  
**Date Received:** 31/08/2011

**No of Samples:** 12  
**Date Testing Commenced:** 31/08/2011  
**Date Testing Completed:** 09/09/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample



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Dr Paul J Wright  
(Laboratory Coordinator)  
[paulw@tweed.nsw.gov.au](mailto:paulw@tweed.nsw.gov.au)

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2410-C  
**Date Testing Completed:** 09/09/2011  
**Date of Report:** 09/09/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
 MURWILLUMBAH  
 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2410-C  
**Date Testing Completed:** 09/09/2011  
**Date of Report:** 09/09/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Date Received:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Date Testing Commenced:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Test	Method	Units	11/2410-C-1	11/2410-C-2	11/2410-C-3	11/2410-C-4	11/2410-C-5
pH	P1	pH units	4.5	6.7	4.9	6.8	4.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	51	186	457	7,190	108
DO (membrane electrode)	P12	mg/L	0.9	3.9	1.2	3.8	2.5
*Redox Potential	P16	mV	+320	+255	+290	+210	+330
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Date Received:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Date Testing Commenced:			31/08/2011	31/08/2011	31/08/2011	31/08/2011	31/08/2011
Test	Method	Units	11/2410-C-6	11/2410-C-7	11/2410-C-8	11/2410-C-9	11/2410-C-10
pH	P1	pH units	4.3	7.5	7.3	4.6	4.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	193	3,619	309	89	162
DO (membrane electrode)	P12	mg/L	0.8	2.3	3.8	2.6	3.7
*Redox Potential	P16	mV	+340	+190	+210	+300	+320
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2410-C  
**Date Testing Completed:** 09/09/2011  
**Date of Report:** 09/09/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			31/08/2011	31/08/2011
Date Received:			31/08/2011	31/08/2011
Date Testing Commenced:			31/08/2011	31/08/2011
Test	Method	Units	11/2410-C-11	11/2410-C-12
pH	P1	pH units	5.4	4.2
Conductivity	P2	$\mu\text{Scm}^{-1}$	99	472
DO (membrane electrode)	P12	mg/L	5.5	8.5
*Redox Potential	P16	mV	+310	--
Turbidity	P8	ntu	--	6.7
Suspended Solids	P4	mg/L	--	6.6
Oil and Grease	C8	mg/L	--	<2
Total Phosphorus-P	C17	mg/L	--	<0.05
Total-N	C7	mg/L	--	0.14



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](mailto:samlereception@tweed.nsw.gov.au) ABN: 90 178 732 496  
(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)  
[www.tweedlab.com.au](http://www.tweedlab.com.au)

## FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 9

**Attention:** Steve Peterson  
**Copy To:** Fax: 02 6672 3896

**Lims1 Report No:** 11/2710-C  
**Client Reference:**  
**Date of Report:** 12/10/2011

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**Taken By:** Client  
**Date Taken:** 30/09/2011  
**Date Received:** 30/09/2011

**No of Samples:** 26  
**Date Testing Commenced:** 30/09/2011  
**Date Testing Completed:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample - Top
13	Lake Sample - 2 Metre
14	Lake Sample - 3 Metre
15	SW 1



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Accreditation No: 12754 & 13538

  
Dr Paul J Wright  
(Laboratory Coordinator)  
[paulw@tweed.nsw.gov.au](mailto: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:** 11/2710-C

**Date Testing Completed:** 12/10/2011

**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

<b>Sample/Site No</b>	<b>Sample/Site Description</b>
16	SW 2
17	SW 3
18	SW 4
19	SW 5
20	SW 6
21	SW 7
22	SW 8
23	SW 9
24	SW 10
25	SW 12
26	Lake Sample

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:** 30-32 Lundberg Drive

MURWILLUMBAH  
NSW 2484

**Attention:** Steve Peterson

**Lims1 Report No:** 11/2710-C

**Date Testing Completed:** 12/10/2011

**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

NP = Not Present.

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2710-C  
**Date Testing Completed:** 12/10/2011  
**Date of Report:** 11/2710-C-5

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Received:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Testing Commenced:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Test	Method	Units	11/2710-C-1	11/2710-C-2	11/2710-C-3	11/2710-C-4	11/2710-C-5
pH	P1	pH units	4.1	6.9	5.1	6.8	4.6
Conductivity	P2	$\mu\text{Scm}^{-1}$	78	192	366	7,111	122
*Redox Potential	P16	mV	+287	+262	+276	+246	+249
P-Alkalinity as CaCO <sub>3</sub>	C10	mg/L	NP	NP	NP	NP	NP
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	NP	55	4	220	<1
Bicarbonate HCO <sub>3</sub>	C10	mg/L	NP	34	2	136	<1
DO (membrane electrode)	P12	mg/L	3.4	4.2	2.3	4.1	4.7
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--
Chloride	C20	mg/L	9	18	88	2,250	17
Calcium	M8	mg/L	0.4	10.0	0.8	86.0	1.4
Magnesium	M8	mg/L	0.3	10.0	2.2	142.0	2.6
Sodium	M8	mg/L	6.3	23.0	85.0	1,526.0	18.0
Potassium M8	M8	mg/L	<5.0	<5.0	<5.0	66.0	<5.0
Sulphur as Sulphate	M8	mg/L	11.0	14.0	29.0	147.0	23.0
Aluminium (Total)	M8	mg/L	0.51	0.41	1.79	0.07	0.28
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	2.36	4.28	0.97	0.30	2.56
Manganese (Total)	M8	mg/L	<0.01	<0.01	<0.01	0.62	<0.01

## Tweed Laboratory Centre

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 NSW 2484  
**Attention:** Steve Peterson

**Lims1 Report No:** 11/2710-C  
**Date Testing Completed:** 12/10/2011  
**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Received:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Testing Commenced:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Test	Method	Units	11/2710-C-6	11/2710-C-7	11/2710-C-8	11/2710-C-9	11/2710-C-10
pH	P1	pH units	3.8	7.9	7.7	4.9	4.7
Conductivity	P2	$\mu\text{Scm}^{-1}$	242	3,573	318	158	149
*Redox Potential	P16	mV	+340	+229	+210	+271	+306
P-Alkalinity as CaCO <sub>3</sub>	C10	mg/L	NP	NP	NP	NP	NP
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	NP	4	120	2	1
Bicarbonate HCO <sub>3</sub>	C10	mg/L	NP	2	72	1	<1
DO (membrane electrode)	P12	mg/L	2.9	2.5	6.4	5.6	2.6
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--
Chloride	C20	mg/L	15	630	22	12	18
Calcium	M8	mg/L	3.6	21.0	54.0	1.5	7.5
Magnesium	M8	mg/L	7.8	45.0	4.1	0.6	4.6
Sodium	M8	mg/L	21.0	790.0	20.0	11.0	13.0
Potassium M8	M8	mg/L	<5.0	42.0	<5.0	<5.0	<5.0
Sulphur as Sulphate	M8	mg/L	70.0	204.0	10.0	12.0	34.0
Aluminium (Total)	M8	mg/L	0.56	0.41	0.04	0.57	0.20
Arsenic (Total)	M7	mg/L	0.005	<0.005	<0.005	0.008	<0.005
Iron (Total)	M8	mg/L	9.20	0.21	0.33	14.0	9.73
Manganese (Total)	M8	mg/L	0.01	0.05	<0.01	<0.01	0.11

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2710-C  
**Date Testing Completed:** 12/10/2011  
**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample - Top	Lake Sample - 2 Metre	Lake Sample - 3 Metre	SW 1
Date Taken:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Received:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Testing Commenced:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Test	Method	Units	11/2710-C-11	11/2710-C-12	11/2710-C-13	11/2710-C-14	11/2710-C-15
pH	P1	pH units	4.8	5.9	6.0	5.8	7.3
Conductivity	P2	$\mu\text{Scm}^{-1}$	96	491	486	488	10,196
*Redox Potential	P16	mV	+317	--	--	--	--
P-Alkalinity as CaCO <sub>3</sub>	C10	mg/L	NP	NP	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	1	4	--	--	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	<1	2	--	--	--
DO (membrane electrode)	P12	mg/L	3.1	8.7	8.5	8.6	7.0
Turbidity	P8	ntu	--	2.3	1.9	8.7	16
Suspended Solids	P4	mg/L	--	<1	2.0	41	7.8
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	<0.05	<0.05	<0.05	0.06
Total-N	C7	mg/L	--	0.41	0.29	0.35	0.47
Chloride	C20	mg/L	18	23	--	--	--
Calcium	M8	mg/L	1.6	76.0	--	--	--
Magnesium	M8	mg/L	2.1	6.2	--	--	--
Sodium	M8	mg/L	13.0	19.0	--	--	--
Potassium M8	M8	mg/L	<5.0	<5.0	--	--	--
Sulphur as Sulphate	M8	mg/L	10.0	209.0	--	--	--
Aluminium (Total)	M8	mg/L	0.19	0.30	--	--	--
Arsenic (Total)	M7	mg/L	<0.005	<0.005	--	--	--
Iron (Total)	M8	mg/L	7.92	0.19	--	--	--
Manganese (Total)	M8	mg/L	<0.01	0.22	--	--	--

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2710-C  
**Date Testing Completed:** 12/10/2011  
**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 2	SW 3	SW 4	SW 5	SW 6
Date Taken:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Received:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Testing Commenced:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Test	Method	Units	11/2710-C-16	11/2710-C-17	11/2710-C-18	11/2710-C-19	11/2710-C-20
pH	P1	pH units	6.9	6.6	6.9	6.9	6.9
Conductivity	P2	$\mu\text{Scm}^{-1}$	15,752	10,416	15,566	15,562	15,516
*Redox Potential	P16	mV	--	--	--	--	--
P-Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	7.0	6.3	7.6	7.1	6.4
Turbidity	P8	ntu	18	33	9.1	9.6	16
Suspended Solids	P4	mg/L	11	16	4.8	5.0	11
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Total-N	C7	mg/L	0.48	0.66	0.34	0.37	0.44
Chloride	C20	mg/L	--	--	--	--	--
Calcium	M8	mg/L	--	--	--	--	--
Magnesium	M8	mg/L	--	--	--	--	--
Sodium	M8	mg/L	--	--	--	--	--
Potassium M8	M8	mg/L	--	--	--	--	--
Sulphur as Sulphate	M8	mg/L	--	--	--	--	--
Aluminium (Total)	M8	mg/L	--	--	--	--	--
Arsenic (Total)	M7	mg/L	--	--	--	--	--
Iron (Total)	M8	mg/L	--	--	--	--	--
Manganese (Total)	M8	mg/L	--	--	--	--	--

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2710-C  
**Date Testing Completed:** 12/10/2011  
**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 7	SW 8	SW 9	SW 10	SW 12
Date Taken:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Received:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Date Testing Commenced:			30/09/2011	30/09/2011	30/09/2011	30/09/2011	30/09/2011
Test	Method	Units	11/2710-C-21	11/2710-C-22	11/2710-C-23	11/2710-C-24	11/2710-C-25
pH	P1	pH units	6.7	6.6	6.3	6.4	6.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	15,585	4,593	15,014	12,647	7,968
*Redox Potential	P16	mV	--	--	--	--	--
P-Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Alkalinity as CaCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
Bicarbonate HCO <sub>3</sub>	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	6.3	6.9	6.1	6.2	6.7
Turbidity	P8	ntu	35	19	52	27	16
Suspended Solids	P4	mg/L	22	5.7	53	11	10
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	<0.05	<0.05	0.05	<0.05	<0.05
Total-N	C7	mg/L	0.55	0.57	0.82	0.58	0.45
Chloride	C20	mg/L	--	--	--	--	--
Calcium	M8	mg/L	--	--	--	--	--
Magnesium	M8	mg/L	--	--	--	--	--
Sodium	M8	mg/L	--	--	--	--	--
Potassium M8	M8	mg/L	--	--	--	--	--
Sulphur as Sulphate	M8	mg/L	--	--	--	--	--
Aluminium (Total)	M8	mg/L	--	--	--	--	--
Arsenic (Total)	M7	mg/L	--	--	--	--	--
Iron (Total)	M8	mg/L	--	--	--	--	--
Manganese (Total)	M8	mg/L	--	--	--	--	--

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:** 30-32 Lundberg Drive

MURWILLUMBAH

NSW 2484

**Attention:** Steve Peterson

**Lims1 Report No:** 11/2710-C

**Date Testing Completed:** 12/10/2011

**Date of Report:** 12/10/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			Lake Sample
Date Taken:			30/09/2011
Date Received:			30/09/2011
Date Testing Commenced:			30/09/2011
Test	Method	Units	11/2710-C-26
pH	P1	pH units	--
Conductivity	P2	$\mu\text{Scm}^{-1}$	--
*Redox Potential	P16	mV	--
P-Alkalinity as $\text{CaCO}_3$	C10	mg/L	--
Alkalinity as $\text{CaCO}_3$	C10	mg/L	--
Bicarbonate $\text{HCO}_3$	C10	mg/L	--
DO (membrane electrode)	P12	mg/L	--
Turbidity	P8	ntu	--
Suspended Solids	P4	mg/L	--
Oil and Grease	C8	mg/L	<2
Total Phosphorus-P	C17	mg/L	--
Total-N	C7	mg/L	--
Chloride	C20	mg/L	--
Calcium	M8	mg/L	--
Magnesium	M8	mg/L	--
Sodium	M8	mg/L	--
Potassium M8	M8	mg/L	--
Sulphur as Sulphate	M8	mg/L	--
Aluminium (Total)	M8	mg/L	--
Arsenic (Total)	M7	mg/L	--
Iron (Total)	M8	mg/L	--
Manganese (Total)	M8	mg/L	--





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](mailto:samlereception@tweed.nsw.gov.au) ABN: 90 178 732 496  
(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)  
[www.tweedlab.com.au](http://www.tweedlab.com.au)

## FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 4

**Attention:** Steve Peterson  
**Copy To:** Fax: 02 6672 3896

**Lims1 Report No:** 11/2989-C  
**Client Reference:**  
**Date of Report:** 10/11/2011

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**Taken By:** Client  
**Date Taken:** 27/10/2011  
**Date Received:** 28/10/2011  
**No of Samples:** 12  
**Date Testing Commenced:** 28/10/2011  
**Date Testing Completed:** 10/11/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
1	DLP 1
2	DLP 2
3	DLP 3
4	DLP 4
5	DLP 5
6	DLP 6
7	DLP 7
8	DLP 8
9	DLP 9
10	DLP 10
11	DLP 11
12	Lake Sample



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Accreditation No: 12754 & 13538

  
Dr Paul J Wright  
(Laboratory Coordinator)  
[paulw@tweed.nsw.gov.au](mailto: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:** 11/2989-C

**Date Testing Completed:** 10/11/2011

**Date of Report:** 10/11/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

---

### COMMENTS:

Results refer to samples as received at the Laboratory.

\* Tests not covered by NATA accreditation.

Dissolved Oxygen, Redox and pH should be performed on site.

The results may not reflect the true level at the time of sampling.

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2989-C  
**Date Testing Completed:** 10/11/2011  
**Date of Report:** 10/11/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			27/10/2011	27/10/2011	27/10/2011	27/10/2011	27/10/2011
Date Received:			28/10/2011	28/10/2011	28/10/2011	28/10/2011	28/10/2011
Date Testing Commenced:			28/10/2011	28/10/2011	28/10/2011	28/10/2011	28/10/2011
Test	Method	Units	11/2989-C-1	11/2989-C-2	11/2989-C-3	11/2989-C-4	11/2989-C-5
pH	P1	pH units	4.2	6.6	5.0	6.5	4.9
Conductivity	P2	$\mu\text{Scm}^{-1}$	73	180	172	7,071	114
DO (membrane electrode)	P12	mg/L	1.4	2.2	3.5	2.1	2.2
*Redox Potential	P16	mV	+360	+293	+342	+243	+295
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			27/10/2011	27/10/2011	27/10/2011	27/10/2011	27/10/2011
Date Received:			28/10/2011	28/10/2011	28/10/2011	28/10/2011	28/10/2011
Date Testing Commenced:			28/10/2011	28/10/2011	28/10/2011	28/10/2011	28/10/2011
Test	Method	Units	11/2989-C-6	11/2989-C-7	11/2989-C-8	11/2989-C-9	11/2989-C-10
pH	P1	pH units	4.2	7.5	7.3	5.1	5.1
Conductivity	P2	$\mu\text{Scm}^{-1}$	233	3,511	306	154	118
DO (membrane electrode)	P12	mg/L	2.5	2.0	3.4	2.0	1.4
*Redox Potential	P16	mV	+353	+223	+213	+311	+295
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	--	--	--	--	--
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	--	--	--	--	--
Total-N	C7	mg/L	--	--	--	--	--

## Tweed Laboratory Centre

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

**Lims1 Report No:** 11/2989-C  
**Date Testing Completed:** 10/11/2011  
**Date of Report:** 10/11/2011

**Sample Description:** Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			27/10/2011	27/10/2011
Date Received:			28/10/2011	28/10/2011
Date Testing Commenced:			28/10/2011	28/10/2011
Test	Method	Units	11/2989-C-11	11/2989-C-12
pH	P1	pH units	5.8	6.5
Conductivity	P2	$\mu\text{Scm}^{-1}$	119	473
DO (membrane electrode)	P12	mg/L	2.3	--
*Redox Potential	P16	mV	+267	--
Turbidity	P8	ntu	--	6.3
Suspended Solids	P4	mg/L	--	16
Oil and Grease	C8	mg/L	--	3
Total Phosphorus-P	C17	mg/L	--	<0.05
Total-N	C7	mg/L	--	0.32



Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia  
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(All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)  
[www.tweedlab.com.au](http://www.tweedlab.com.au)

## 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:** 11/2989-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 31/10/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 27/10/2011 **Date Testing Commenced:** 28/10/2011  
**Date Received:** 28/10/2011 **Date Testing Completed:** 31/10/2011

**Sample Description:** Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/2989-A/1	1	Lake Sample

### COMMENTS:

Results refer to samples as received at the Laboratory.



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Dr Paul J Wright  
(Laboratory Coordinator)  
[paulw@tweed.nsw.gov.au](mailto:paulw@tweed.nsw.gov.au)

## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
30-32 Lundberg Drive  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/2989-A

**Date Testing Completed:** 31/10/2011

**Date of Report:** 31/10/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/2989-A/1			
	<i>Pseudanabaena</i> (Cyanophyta)	B9	cells/mL	60
	<i>Pseudanabaena</i> Biovolume	B20	mm <sup>3</sup> /L	<0.01
	Dinophyta (Dinoflagellates)	B9	cells/mL	2120



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## FINAL CERTIFICATE OF ANALYSIS

**Client:** Ramtech Pty Ltd Page 1 of 2  
**Address:** 61-65 Quarry Road  
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NSW 2484

**Attention:** Steve Peterson **Lims1 Report No:** 11/2710-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 04/10/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 30/09/2011 **Date Testing Commenced:** 30/09/2011  
**Date Received:** 30/09/2011 **Date Testing Completed:** 30/09/2011

**Sample Description:** Dunloe Sands Water Sample - Algae


LIMS NO.	Sample/Site No	Sample/Site Description
11/2710-A/1	1	Lake Sample

### COMMENTS:

Results refer to samples as received at the Laboratory.



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

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/2710-A

**Date Testing Completed:** 30/09/2011

**Date of Report:** 04/10/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/2710-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100





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**Client:** Ramtech Pty Ltd Page 1 of 2  
**Address:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

**Attention:** Steve Peterson **Lims1 Report No:** 11/2410-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 02/09/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 31/08/2011 **Date Testing Commenced:** 31/08/2011  
**Date Received:** 31/08/2011 **Date Testing Completed:** 02/09/2011

**Sample Description:** Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/2410-A/1	1	Lake Sample

### COMMENTS:

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Dr Paul J Wright  
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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/2410-A  
**Date Testing Completed:** 02/09/2011  
**Date of Report:** 02/09/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/2410-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:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

**Attention:** Steve Peterson **Lims1 Report No:** 11/2098-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 01/08/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 28/07/2011 **Date Testing Commenced:** 29/07/2011  
**Date Received:** 29/07/2011 **Date Testing Completed:** 01/08/2011

**Sample Description:** Dunloe Sands Water Sample - Algae


LIMS NO.	Sample/Site No	Sample/Site Description
11/2098-A/1	1	Lake Sample

### COMMENTS:

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Sally Everson  
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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/2098-A  
**Date Testing Completed:** 01/08/2011  
**Date of Report:** 01/08/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/2098-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:** 61-65 Quarry Road  
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**Attention:** Steve Peterson **Lims1 Report No:** 11/1798-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 28/06/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 27/06/2011 **Date Testing Commenced:** 27/06/2011  
**Date Received:** 27/06/2011 **Date Testing Completed:** 27/06/2011

**Sample Description:** Dunloe Sands Lake Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/1798-A/1	1	Lake

### COMMENTS:

ND = Not Detected.  
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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Lake Sample - Algae

**Lims1 Report No:** 11/1798-A

**Date Testing Completed:** 27/06/2011

**Date of Report:** 28/06/2011

LIMS NO.	Algal Identification	Method Code	Units	Count
11/1798-A/1	No Cyanophyta Detected	B9	cells/mL	ND
	Single Celled Chlorophyta	B9	cells/mL	44000
	Diatoms (Bacillariophyta)	B9	cells/mL	55
	Euglenophyta (Euglenoids)	B9	cells/mL	85



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**Client:** Ramtech Pty Ltd Page 1 of 2  
**Address:** 61-65 Quarry Road  
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**Attention:** Steve Peterson **Lims1 Report No:** 11/1660-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 10/06/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 10/06/2011 **Date Testing Commenced:** 10/06/2011  
**Date Received:** 10/06/2011 **Date Testing Completed:** 10/06/2011

**Sample Description:** Dunloe Sands Lake Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/1660-A/1	1	Lake

### COMMENTS:

Results refer to samples as received at the Laboratory.



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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Lake Sample - Algae

**Lims1 Report No:** 11/1660-A

**Date Testing Completed:** 10/06/2011

**Date of Report:** 10/06/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/1660-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100





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**Client:** Ramtech Pty Ltd Page 1 of 2  
**Address:** 61-65 Quarry Road  
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**Attention:** Steve Peterson **Lims1 Report No:** 11/1483-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 26/05/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 23/05/2011 **Date Testing Commenced:** 23/05/2011  
**Date Received:** 23/05/2011 **Date Testing Completed:** 23/05/2011

**Sample Description:** Dunloe Sands Water Sample - Algae


LIMS NO.	Sample/Site No	Sample/Site Description
11/1483-A/1	1	Lake Sample

### COMMENTS:

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Sally Everson  
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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/1483-A  
**Date Testing Completed:** 23/05/2011  
**Date of Report:** 26/05/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/1483-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:** 61-65 Quarry Road  
MURWILLUMBAH  
NSW 2484

**Attention:** Steve Peterson **Lims1 Report No:** 11/1470-A  
**Copy To:** Fax: 02 6672 3896 **Client Reference:**  
**Date of Report:** 20/05/2011

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**Taken By:** Client **No of Samples:** 1  
**Date Taken:** 19/05/2011 **Date Testing Commenced:** 19/05/2011  
**Date Received:** 19/05/2011 **Date Testing Completed:** 20/05/2011

**Sample Description:** Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/1470-A/1	1	Lake

### COMMENTS:

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## Tweed Laboratory Centre

**Client:** Ramtech Pty Ltd

**Address:**  
61-65 Quarry Road  
MURWILLUMBAH

**Attention:** Steve Peterson

**Sample Description:** Dunloe Sands Water Sample - Algae

**Lims1 Report No:** 11/1470-A  
**Date Testing Completed:** 20/05/2011  
**Date of Report:** 20/05/2011

	Algal Identification	Method Code	Units	Count
<b>LIMS NO.</b>	11/1470-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100

