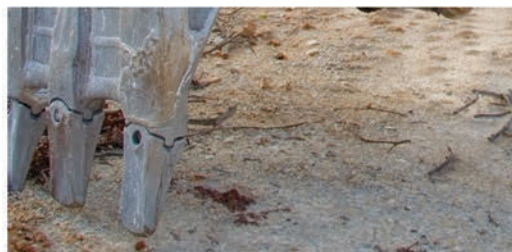
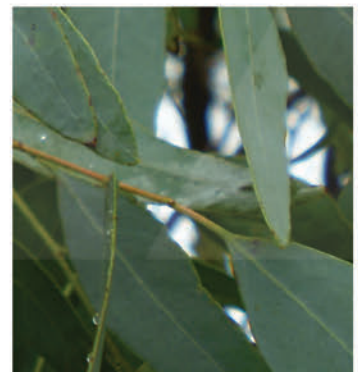
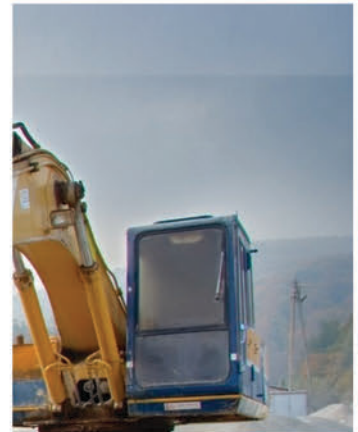




CONSULTING

DUNLOE SANDS

Environmental Monitoring Report
November 2010 to April 2011





Review and Amendments Schedule – PLANIT CONSULTING PTY LTD

		Date
Author	TA	April & May 2011
Reviewer	AS	May 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.

PLANIT CONSULTING PTY LTD[®]
April 2011

Table of Contents

Table of Contents	3
Executive Summary & Introduction	4
1.0 Sampling Program	8
2.0 Monthly Monitoring Results	10
3.0 Quarterly Monitoring Results	19
4.0 Conclusion	30
Appendix A - Ground Water Location Map	32
Appendix B - Surface Water Location Map	33
Appendix C - Laboratory Analysis	34
Appendix D - Acoustic Certification	35

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 2011 with formal commencement occurring in October of 2011. 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 into the local Pottsville markets. As sand demand increases, the Dunloe Park sand may be competitive into the Brisbane market. The average haul distance (130km) is 80 km more than the current distance. However, upgrades to the Pacific Highway, in particular the Tugun Bypass and Banora Bypass, the delivery time and distance will be further decreased.

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 200 m 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 Mm3	Sand Mm3	Total Mm3
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;

- Sand Stockpiles;
- Blue Green Algae;
- Noise (Benchmark testing);
- Dust;
- Vegetation Management and Regeneration (within a separate report);
- Ground Waters; and
- Surface Waters.

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

- Sand Stockpile pH Level results for November 2010 to April 2011;
- Algae Level results for January to March 2011;
- Ground Water chemical results for January to March 2011;
- Noise testing results;
- Surface Water chemical results for March 2011; and

- Rainfall levels from November 2010 to March 2011.

Water samples for algae were collected twice monthly between January and March 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.

Groundwaters were sampled monthly over a 3-month period between January and March 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 quarterly sampling took place in March 2011 which sampled 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 March 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 November 2010 to March 2011. The recorded rainfall averaged from three sites – Coolangatta, Murwillumbah and Byron Bay – was approximately 1,121.1mm over the five month period.

Complaints Recorded

No complaints have been registered by the proponents to date.

Acoustic Testing (Noise)

Pursuant to the consent conditions and approved EMP, operational noise testing was undertaken by the proponents (CRG Consulting), with a focus on all relative plant, machinery and loading and unloading. The results of this testing indicate that operations are performing as indicated in the development application and do not exceed background levels associated with surrounding residents.

A copy of this certification is 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 sand stockpile, algae, surface water and groundwater monitoring for the project. Ramtech commenced monitoring in November given that this coincided with the in earnest commercial operations of the project.

The Sand stockpile was sampled weekly for a period of 23-weeks between November 2010 and April 2011, although operations commenced in September on a limited trial scale only. To date, operations have been limited by market conditions and are estimated to comprise an extraction rate of only 20,000 tonnes per annum.

The weekly samples monitored the pH levels present. Samples of the Lake at site 1 were taken twice monthly for two months to monitor the mixed algae within the lake.

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**.

It is noted the results illustrated within this report have been taken directly from the Laboratory Reports. The full laboratory Reports are provided 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) 19 th April 2011										
DLP1	DLP2	DLP3	DLP4	DLP5	DLP6	DLP7	DLP8	DLP9	DLP10	DLP11
0.64	0.62	0.58	0.59	0.68	0.60	0.62	0.62	0.58	0.57	0.59

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 Dust Monitoring

The EMP sets out the Dust monitoring requirements applicable to the site. This criterion was developed in accord with the original testing undertaken by Simmonds & Bristow which was based on benchmark background results associated with the climatic and environmental conditions on site.

Dust deposition gauges and custom stands have been erected at various locations around the site in accord with the EMP and Australian Standard AS 2922-1987 "Ambient Air - Guide for the Siting of Sampling Units" (NSW DECC Method AM-1) and AS 3580.9.6-2003 "Particulate Matter - PM10 - high volume sampler with size selective inlet".

Practical sampling on site has been difficult in the preceding months due to the extent of rain and the inability to gain unaffected samples due to the frequency of rain events and as such no sampling has been undertaken to date. It is intended to rectify this situation over the winter months.

It is pertinent to note nonetheless that Ramtech have implemented mechanical sprinkler systems on site and undertaken all sealing works in accord with the EMP requirements and conditions of consent.

2.3 Sand Stockpile Results

Figure 1 displays the results for November 2010 to April 2011. Results are displayed in pH levels at a weekly monitoring rate.

Laboratory analysis is provided in **Appendix C**.

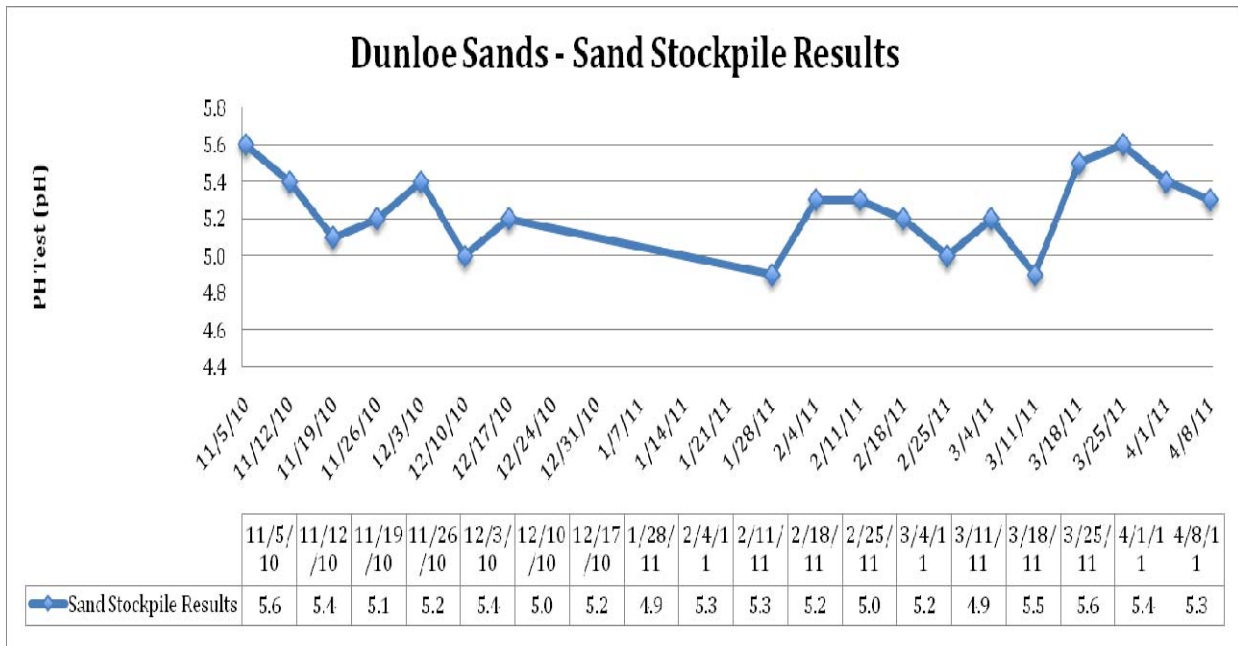


Figure 1: Dunloe Sands - Sand Stockpile (pH Test) Results November 2010 to April 2011

The results displayed show pH levels within the sand stockpile to be generally consistent. Over the six month monitoring period pH levels ranged between 4.9pH and 5.6pH. Analysing this graph against the total rainfall on site shows direct correlations illustrating that increased rainfall in the vicinity produce lower pH levels within the lake. This correlation explains the varied pH level results as rainfall over December and January are considerably higher than that of the other months within the monitoring period, although considerable rainfall was also experienced within the low peak noticeable in March.

2.4 Mixed Algae Results

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

Table 1: Dunloe Sands – Lake - Mixed Algae Results January to March 2011

	21/01/2011	27/01/2011	14/02/2011	28/02/2011	18/03/2011	28/03/2011
Mixed Algae (cells/mL)	<100	<100	<100	<100	<100	<100

The results gather between January and March 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.

2.5 Ground Water & Lake Results

Monthly ground water monitoring was conducted between January 2011 and March 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 three 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.

It is noted data and results for March at sample site DLP5 is not available within any of the conducted tests.

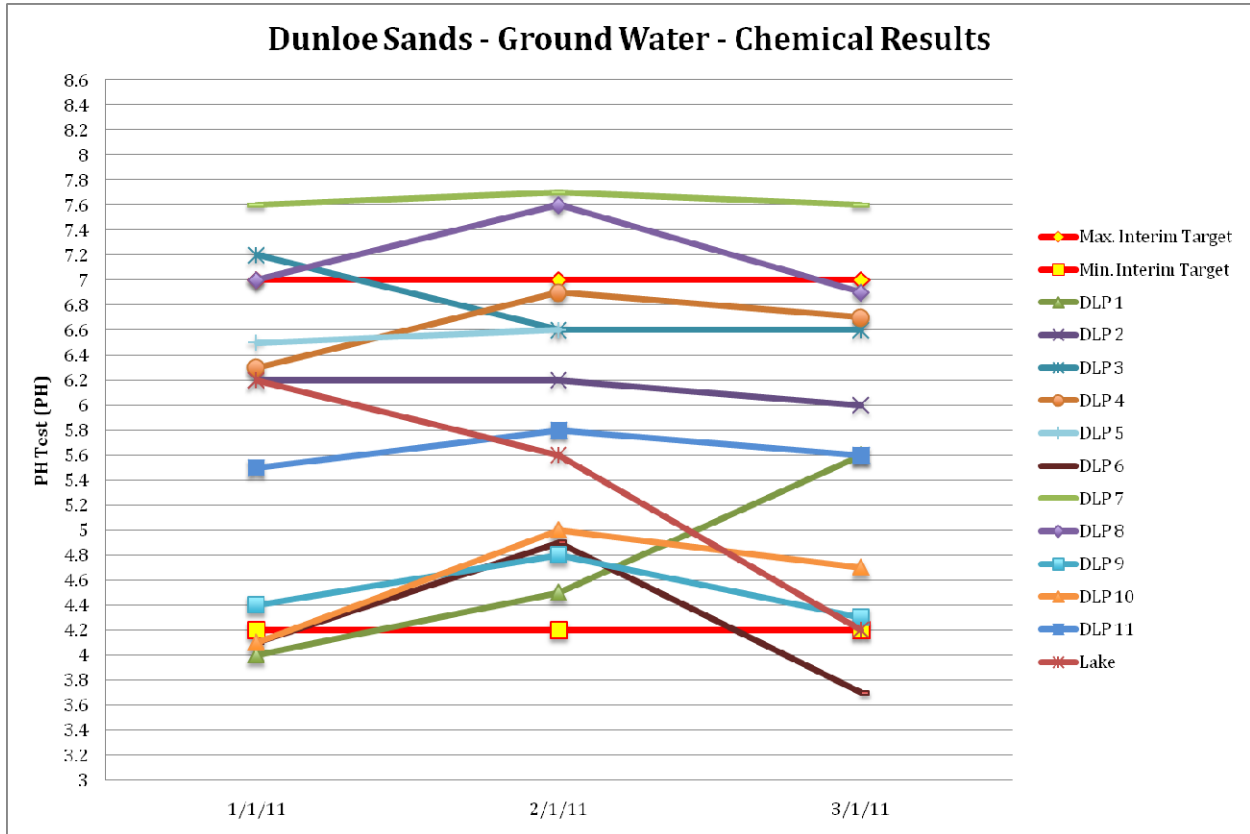


Figure 2: Dunloe Sands - Ground Water - Chemical (pH Test) Results January to March 2011

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 constantly sits outside the maximum levels by between .6 and .7pH presenting a lower (more alkaline) acidity level than that of the target level, whilst DLP 8 also lifted above the target level in February. This is not unexpected given that similar levels were experienced prior to construction within background testing.

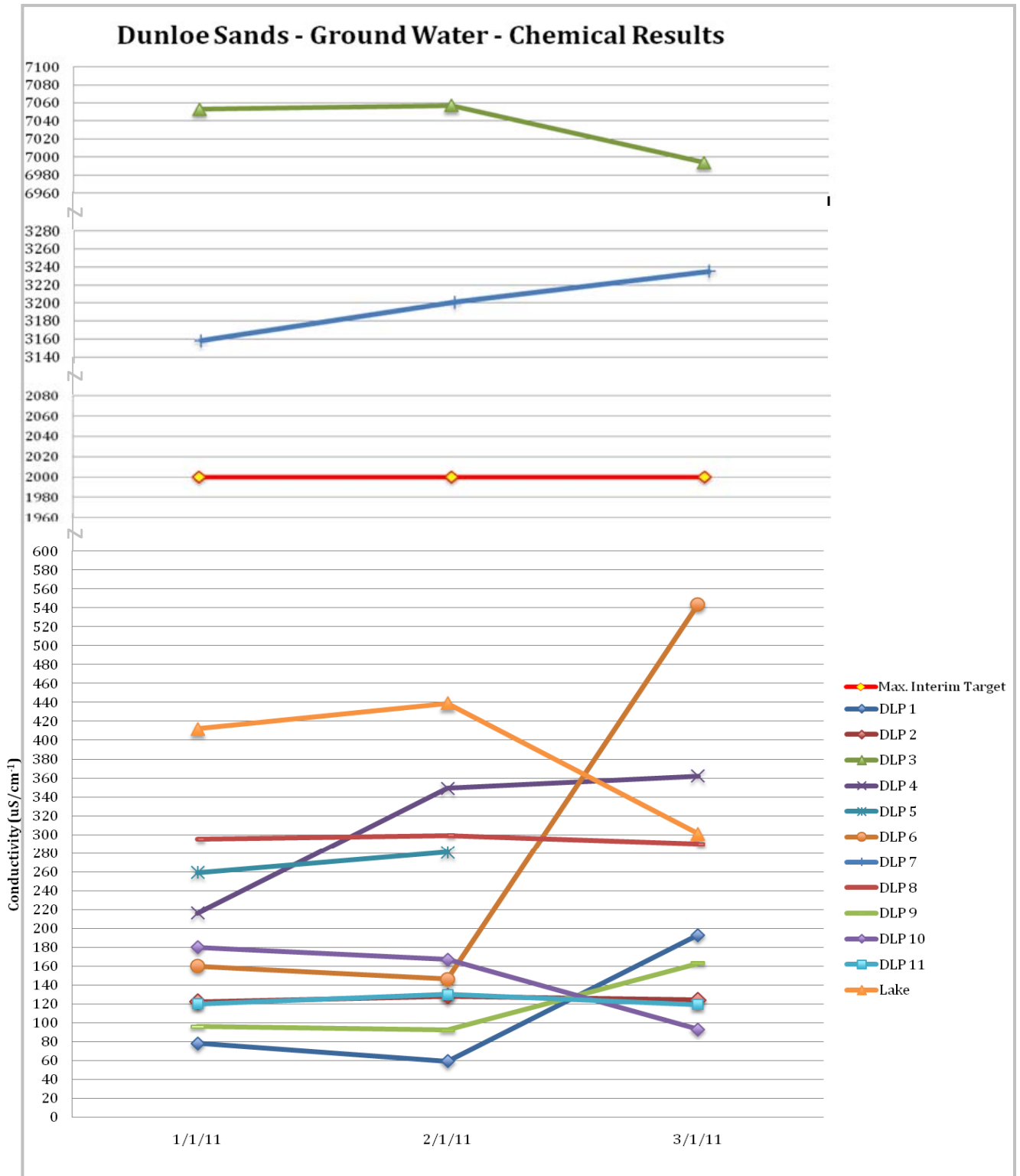


Figure 3: Dunloe Sands - Ground Water - Chemical (EC Test) Results January to March 2011

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

Two samples sites; DLP3 and DLP7 present conductivity levels well above the maximum interim target of 2,000uS/cm⁻¹ stated within the EMP, each of which also expressed similar levels of EC within background testing. This is quite easily explained in respect of DLP 3 as DLP3 was 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 therefore considered likely that some localised salinisation of surficial groundwaters has occurred within the vicinity of monitoring location DLP3 due to tidal influences within these nearby waterways.

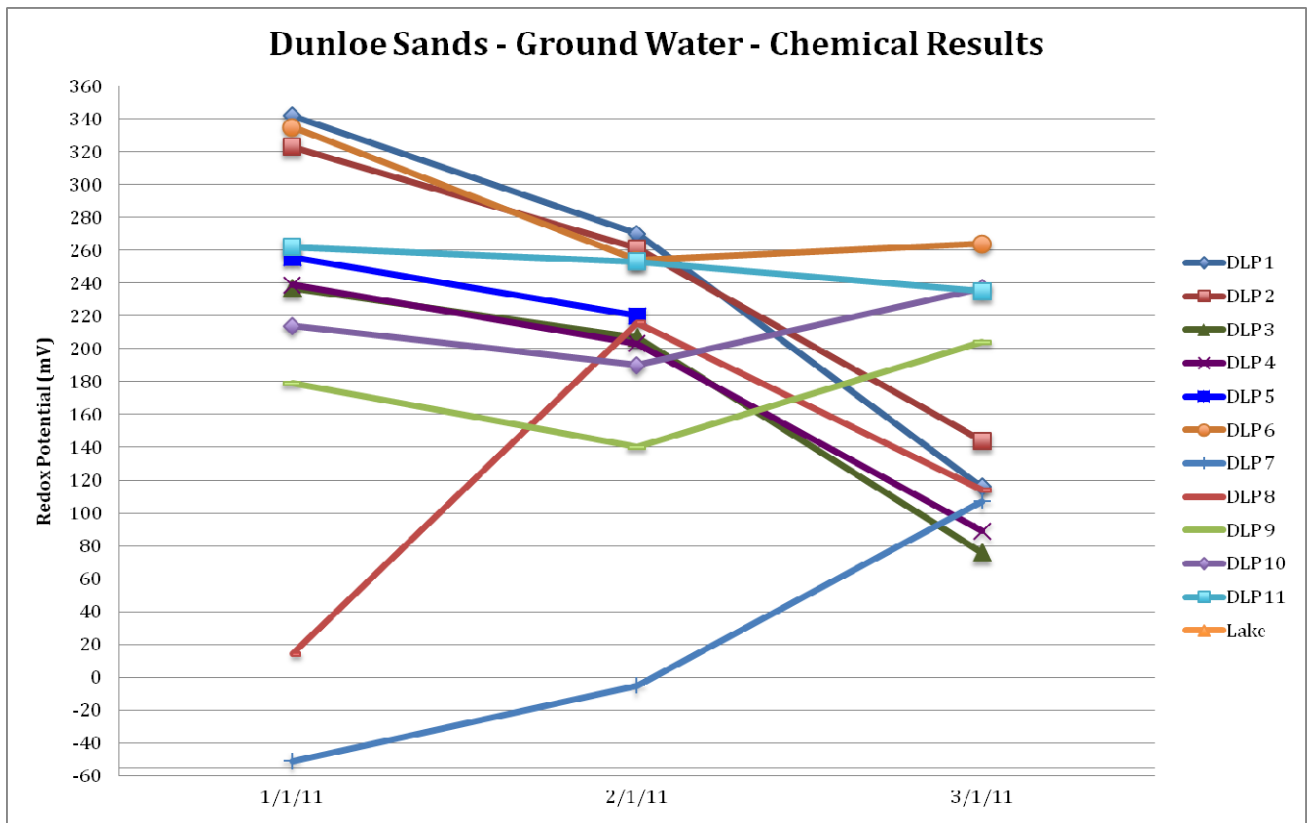


Figure 4: Dunloe Sands - Ground Water - Chemical (Redox Potential Test) Results January to March 2011

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 higher to lower Redox Potential rate and the locations DLP 6, DLP 9, DLP 10 and DLP 11 producing a steady or higher - lower - higher Redox Potential rate. DLP 7 depicts an extremely low Redox Potential level of -51 in January that increases rather rapidly to +105 during March, this is difficult to explain but is likely to be related to the decomposition of sub surface organic matter given its location immediately proximate to the adjacent wetland.

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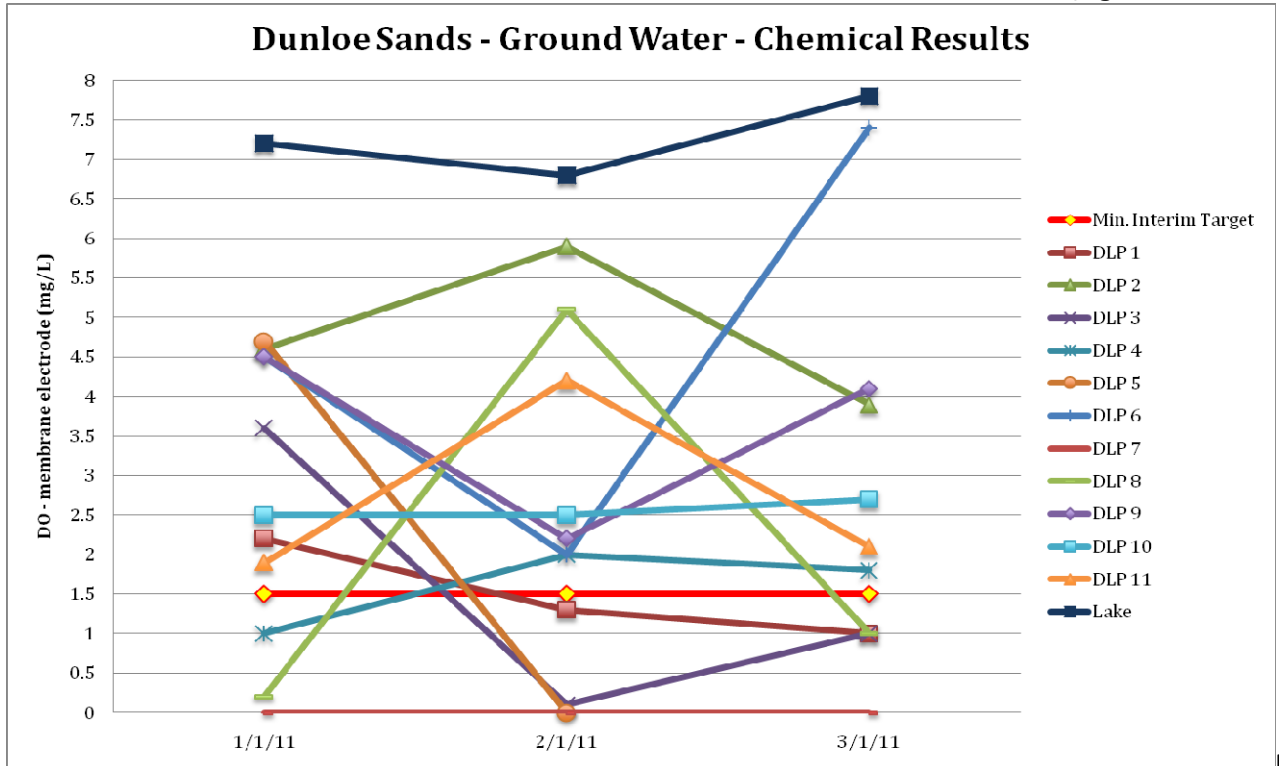


Figure 5: Dunloe Sands - Ground Water - Chemical (DO Test) Results January to March 2011

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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 three month monitoring period.

The majority of groundwater samples collected is above the minimum interim target however ten samples collected from varied locations present levels below the target. The lake sample presents the highest level and remains above 6.5mg/ML.

Whilst background testing indicated generally low DO levels inherently across the site, the results for DLP 7, 1, 3 & 5 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.

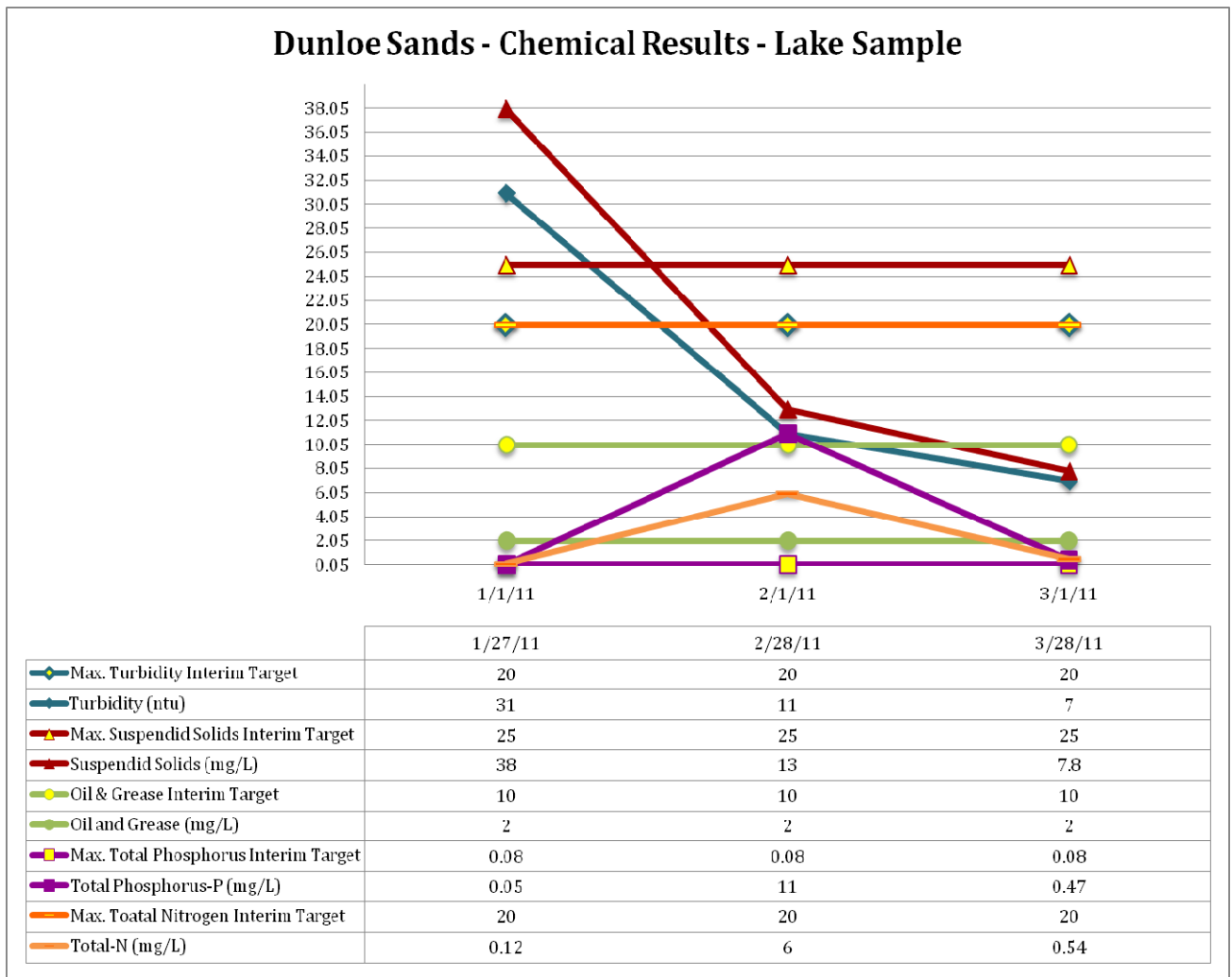


Figure 6: Dunloe Sands - Lake - Chemical Results January to March 2011

Interim target levels for turbidity present a maximum level of 20ntu within the EMP. The levels recorded over the three month monitoring period show levels above the maximum during January however levels are decreased to below maximum levels during the February and March monitoring. This could be generally explained by the high rainfall experienced in January, however it also warrants consideration of the effectiveness of ensuring that surface water inflows do not flow into the lake from external sources (inclusive of the plant area).

The maximum interim target level for the suspended solids within the EMP is 25mg/L. Results present a level above the maximum during January and levels below this target during February and March. Again this result is likely due to the excessively high rainfall experienced in January. 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 three month monitoring period at 2mg/L.

Total phosphorus levels are generally higher than the maximum interim target levels contained within the EMP. January results present lower than target levels of phosphorus however the results of February sampling presents a sharp increase well above the target levels. During March the level of phosphorus decreased considerably producing a level only slightly higher than the target rate. It is difficult to explain

the elevated reading in February as Suspended Solids (often concurrently high with phosphorous readings) were quite low at the equivalent time.

Total nitrogen levels remain consistently lower than the interim target of 20mg/L with a maximum result of 6mg/L.

2.5 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.

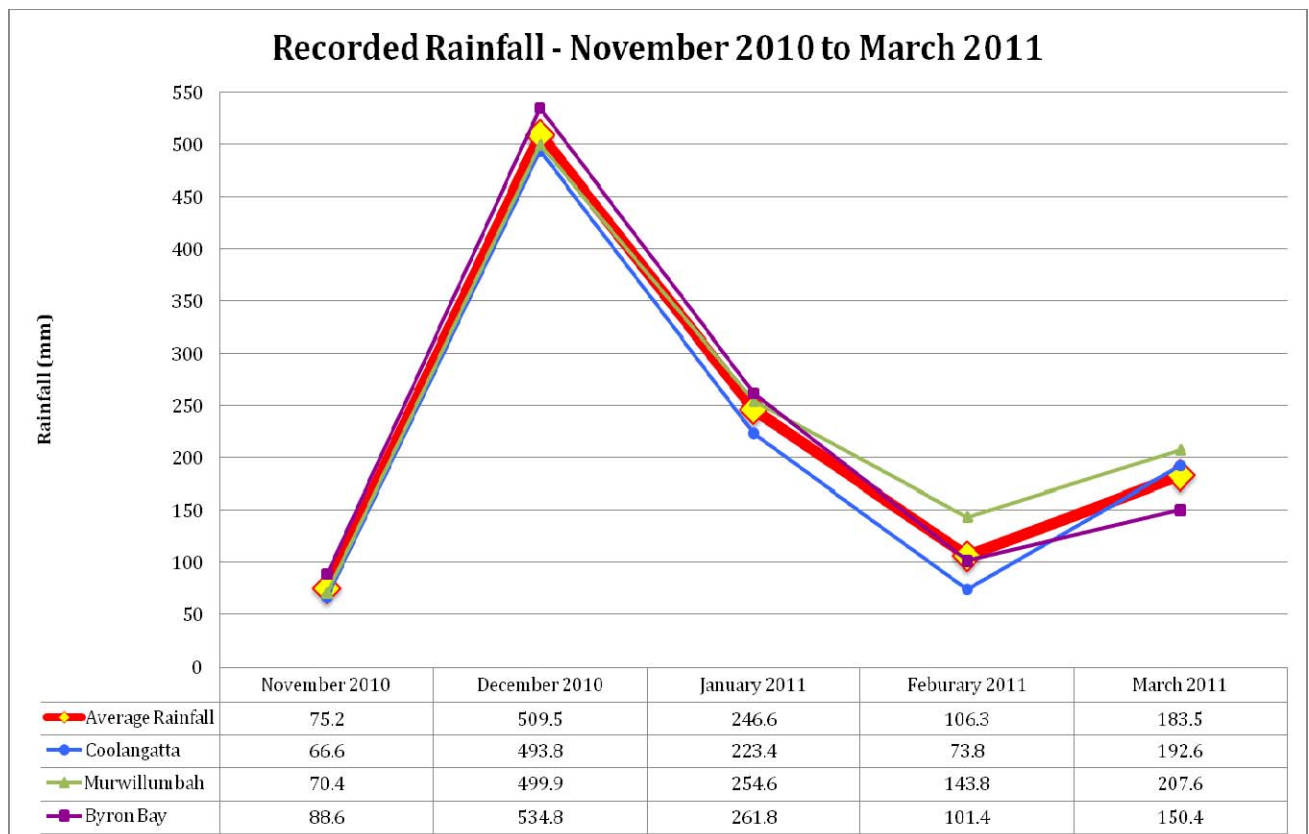


Figure 7: Recorded Rainfall November 2010 to March 2011

The recorded rainfall of the three suburbs surrounding Pottsville has been averaged to produce an approximate on site rainfall. December 2010 presented a high level of rain with approximately 509.5mm of rain being recorded. In total over the five month period approximately 1,121.1mm 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 for 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 March 2011. Tables present the results compared against the interim target criteria contained within the EMP.

It is noted data and results for March at sample site DLP 5 is not available within any of the conducted tests, presumably due to accessibility constraints.

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

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Table 2: Dunloe Sands - Ground Water - Chemical (Chloride Test) Results (mg/L)

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	27.0	22.0	2,200.0	59.0	-	24.0	930.0	24.0	15.0	16.0	18.0	14.0
Interim Target	285.0	285.0	285.0	285.0	285.0	285.0	285.0	285.0	285.0	285.0	285.0	285.0

Comments: As highlighted previously, two samples sites (DLP3 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm⁻¹ 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 in respect of DLP 3 as DLP3 was 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 both DLP3 & DLP7 due to tidal influences within these nearby waterways and wetlands.

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	1.9	4.4	66.0	1.7	-	48.0	13.0	36.0	6.1	1.5	1.5	27.0
Interim Target	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0

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.

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	3.3	3.3	104.0	2.1	-	6.7	25.0	3.2	4.1	0.6	1.6	3.6
Interim												
Target	40.0	40.0	40.0	40.0	40.0	40.0	40.0	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.

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	12.0	9.8	1,035	31.0	-	11.0	377.0	12.0	8.7	7.8	9.0	8.2
Interim												
Target	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0	280.0

NB. Major cation

Comments: As highlighted previously, two samples sites (DLP3 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm⁻¹ 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 in respect of DLP 3 as DLP3 was 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 both DLP3 & DLP7 due to tidal influences within these nearby waterways and wetlands

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	6	< 5.0	53.0	< 5.0	-	< 5.0	34.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Interim Target	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5

NB. Major cation

Comments: As highlighted previously, two samples sites (DLP3 and DLP7) presented conductivity levels well above the maximum interim target of 2,000uS/cm⁻¹ 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 in respect of DLP 3 as DLP3 was 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 both DLP3 & 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)

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	31	5.5	133.0	9.9	-	190.0	118.0	3.3	26.0	8.9	8.2	68.0
Interim Target	175	175	175	175	175	175	175	175	175	175	175	175

Comments: A very minor exceedance of the target level was noted at DLP 6, which is 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 and lake and the readings in this bore.

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	< 0.005	< 0.005	< 0.005	< 0.005	-	< 0.005	< 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	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005

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

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	7.8	4.42	0.09	0.59	-	1.44	0.09	1.12	6.45	3.26	7.94	0.73
Interim Target	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5	< 7.5

Comments: A very minor exceedance of the target level was noted at DLP1 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)

	DLP 1	DLP 2	DLP 3	DLP 4	DLP 5	DLP 6	DLP 7	DLP 8	DLP 9	DLP 10	DLP 11	Lake
Sample	0.04	0.03	0.63	< 0.01	-	0.36	0.10	0.12	0.10	0.02	0.03	0.19
Interim Target	0.15	0.15	0.15	0.15	0.15	0.15	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 are entirely expected and consistent with background. Interestingly, the reading at DLP 6 is also consistent with background and therefore is cause for little concern. The proximity of the lake to DLP 6

(which has high background levels inherently) may also explain the slightly elevated reading in the lake, however it is recommended that the interaction between the two (2) be monitored over time before any action is implemented.

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 March 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)

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	7.2	7.1	5.9	6.3	6.4	7.3	6.1	5.9	6.7	6.4	6.4	5.9
Interim Target	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5	5 – 8.5

Table 12: Dunloe Sands - Surface Water - Chemical (EC Test) Results ($\mu\text{S}/\text{cm}^{-1}$)

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	2,021	2,768	336	2,384	4,069	2,028	843	330	4,116	538	3,724	346
Interim Target	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500	< 5,500

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

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	6.2	6.7	4.6	6.2	5.7	7.6	6.5	6.4	5.7	9.2	6.6	5.4
Interim Target	> 4	> 4	> 4	> 4	> 4	> 4	> 4	> 4	> 4	> 4	> 4	> 4

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

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	14	13	14	7.3	24	14	17	11	12	45	12	176
Interim Target	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25	< 25

Comment: Both SW10 and SW 12 are upstream of floodgates and the elevated readings shown above were experienced in March, where a high rainfall was also experienced. This is likely to explain the concentration of suspended solids in these areas. It is recommended that this be monitored in addition to the function of the flood gates during high rainfall events.

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

	SW 1	SW 2	SW 3	SW 4	SW 5	SW 6	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	0.09	0.08	< 0.05	< 0.05	< 0.05	0.09	< 0.05	< 0.05	< 0.05	0.05	< 0.05	0.11
Interim Target	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08

Comments: A very minor exceedance of the target level was noted at SW1, SW6 and SW 12. Further monitoring is recommended however no action is considered necessary at this point given the minor nature of the spike. It is also noted that the levels recorded are generally consistent with the levels recorded in background testing relative to other sites within the property.

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	SW 7	SW 8	SW 9	SW 10	SW 11	SW 12
Sample	0.51	0.52	1.36	0.97	0.88	0.5	1.31	1.3	0.52	1.57	0.88	1.84
Interim Target												

Target	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20	< 20
---------------	------	------	------	------	------	------	------	------	------	------	------	------

Chapter 4.0 Conclusion



4.1 Conclusion

This report represents the initial monitoring report for the operation and will be utilised to not only inform in the immediate sense in respect of operational compliance and environmental characteristics on the site, but also to cross reference in respect of future monitoring reports so as to identify potential trends and areas requiring intervention and environmental amelioration.

The results within the this report demonstrate that generally environmental characteristics remain consistent with background readings and within the acceptable limits set out within the consent and approved EMP, taking into account the pre existing conditions of the site.

It is important to monitor those areas in which mention has been made of the importance to analyse future readings so as to ensure that not only a full understanding is generated in respect of the site and operations but also to ensure that best practice management measures are applied over the longer term.

Adam Smith
Director
Planit Consulting

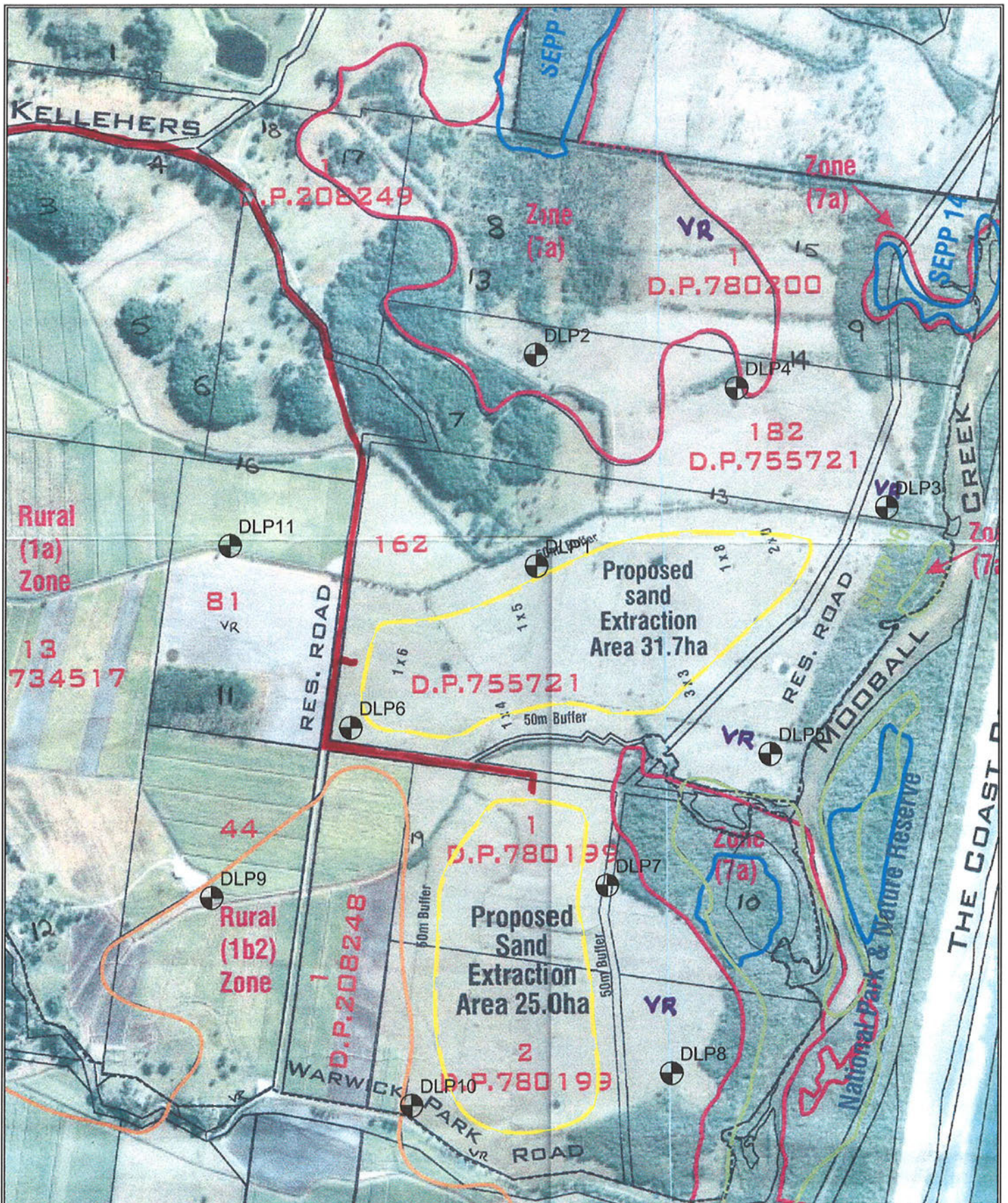
May 2011

Steve Petersen
Director
RAMTECH

May 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.

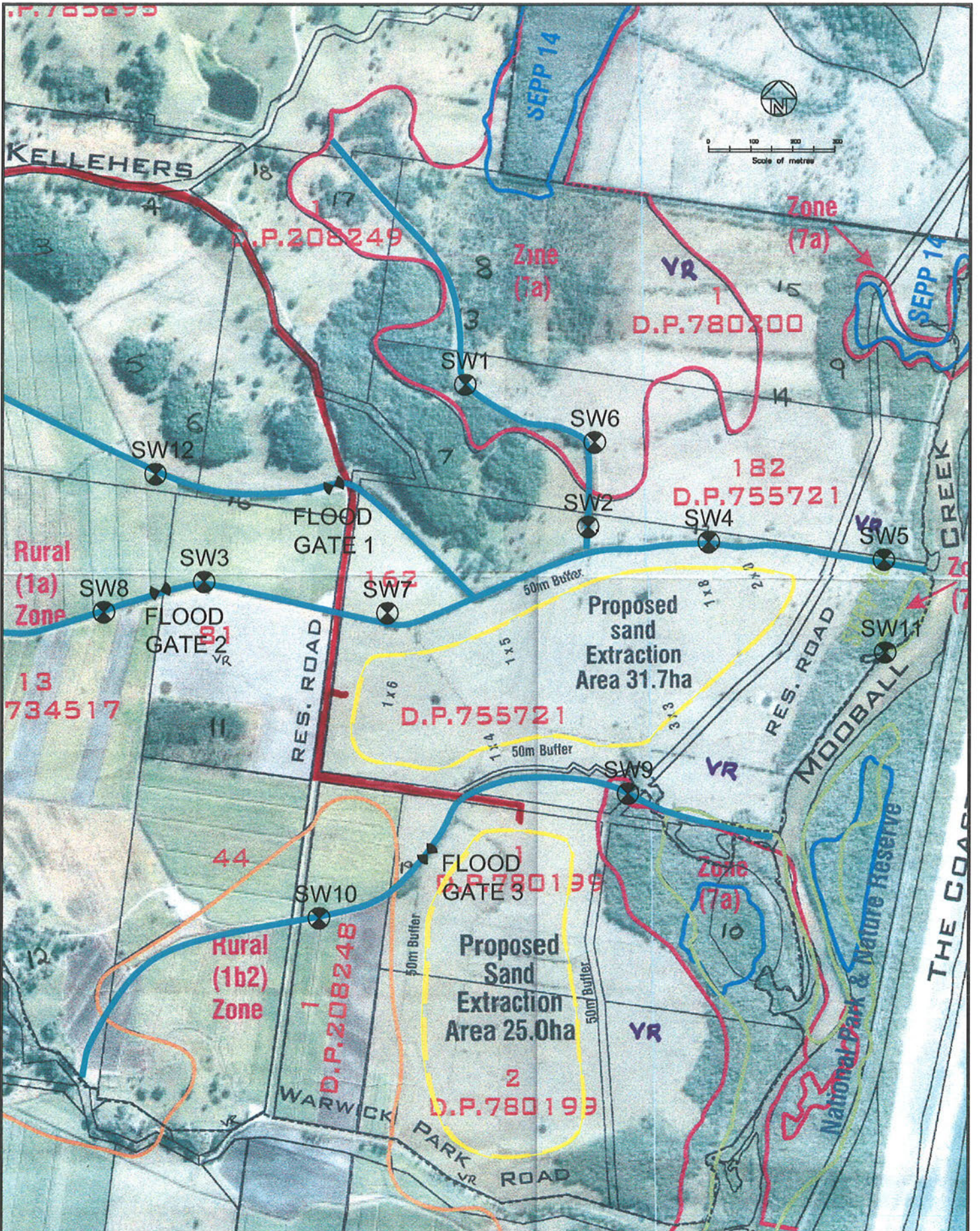
DATE 14/09/04

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 Laboratory Analysis



Tweed Laboratory Centre
TWEED
SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

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: 11/0237-C
Client Reference:
Date of Report: 07/02/2011

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: 12
Date Taken: 27/01/2011	Date Testing Commenced: 27/01/2011
Date Received: 27/01/2011	Date Testing Completed: 07/02/2011

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

AS/NZS ISO 17025
 TECHNICAL
 COMPLIANCE

This document is issued in accordance with NATA's accreditation requirements. 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: 61-65 Quarry Road

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 11/0237-C

Date Testing Completed: 07/02/2011

Date of Report: 07/02/2011

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: 11/0237-C
 Date Testing Completed: 07/02/2011
 Date of Report: 07/02/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Date Received:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Date Testing Commenced:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Test	Method	Units	11/0237-C-1	11/0237-C-2	11/0237-C-3	11/0237-C-4	11/0237-C-5
pH	P1	pH units	4.0	6.2	7.2	6.3	6.5
Conductivity	P2	μScm^{-1}	78	122	7,053	216	259
*Redox Potential	P16	mV	+342	+323	+237	+239	+256
DO (membrane electrode)	P12	mg/L	2.2	4.6	3.6	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	--	--	--	--	--

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Date Received:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Date Testing Commenced:			27/01/2011	27/01/2011	27/01/2011	27/01/2011	27/01/2011
Test	Method	Units	11/0237-C-6	11/0237-C-7	11/0237-C-8	11/0237-C-9	11/0237-C-10
pH	P1	pH units	4.1	7.6	7.0	4.4	4.1
Conductivity	P2	μScm^{-1}	160	3,158	295	96	180
*Redox Potential	P16	mV	+335	-51	+14	+179	+214
DO (membrane electrode)	P12	mg/L	4.5	<0.1	0.2	4.5	2.5
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
SHIRE COUNCIL

Page 4 of 4

Tweed Laboratory Centre

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

Lims1 Report No: 11/0237-C
Date Testing Completed: 07/02/2011
Date of Report: 07/02/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			27/01/2011	27/01/2011
Date Received:			27/01/2011	27/01/2011
Date Testing Commenced:			27/01/2011	27/01/2011
Test	Method	Units	11/0237-C-11	11/0237-C-12
pH	P1	pH units	5.5	6.2
Conductivity	P2	μScm^{-1}	120	412
*Redox Potential	P16	mV	+262	--
DO (membrane electrode)	P12	mg/L	1.9	7.2
Turbidity	P8	ntu	--	31
Suspended Solids	P4	mg/L	--	38
Oil and Grease	C8	mg/L	--	<2
Total Phosphorus-P	C17	mg/L	--	<0.05
Total-N	C7	mg/L	--	0.12



Tweed Laboratory Centre

Chain of Custody Record

Analysis Request

Tweed Laboratory Centre | 46 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph: 07 5569 3103 | Fax: 07 5524 2676 | E: admin@tweedlab.com.au

Company: RANITECH PTY LTD

Address: 71A DUNLOP SANDS

Project Reference:

Purchase Order No.:

Send Results to:

Contact Name: _____
Telephone: _____
Email: _____
Fax: _____

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner.

ANALYSIS REQUIRED (please indicate if total and/or soluble)

SAMPLE DESCRIPTION

Sample ID	Sample Date	Water	Soil	Comments	ALGAE	TOTAL	NITROGEN	PHOSPHORUS	OLIVE	TURB	SS	EC	DO	TDN
LAKE	2/11	✓			✓				✓					
DROP 1-11	"	✓												
ALGAE LAKE	"	✓												

Special Requirements (eg. OHS issues etc.)

Reinquished by (sig): _____ Date: 27/1/11

Reinquished by (name): STEVE PATTERSON Time: 12:30

Received by (sig): _____ Date: 27/1

Received by (name): CKD Time: 12:30

Sample Receipt Advice (Lab Use Only)

All Samples Received in Good Condition

All Documentation in Proper Order

Samples Received Properly Chilled

Samples Received Within Recommended Holding Times

For Enquires please quote Batch No. 10/08330

Subcontracted work:

Please Note: Samples are to be received at the Laboratory no later than 4:30pm unless prior notification has been received (by 1:00pm) or additional charges may apply.

Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

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

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

Lims1 Report No: 11/0567-C
Client Reference: 11/03/2011
Date of Report:

All pages of this Report have been checked and approved.
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Taken By: Client
Date Taken: 28/02/2011
Date Received: 28/02/2011


No of Samples: 12
Date Testing Commenced: 28/02/2011
Date Testing Completed: 11/03/2011

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



This document is issued in accordance with NATA's accreditation requirements. 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: 61-65 Quarry Road
MURWILLUMBAH
NSW 2484
Attention: Steve Peterson

Lims1 Report No: 11/0567-C
Date Testing Completed: 11/03/2011
Date of Report: 11/03/2011

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.

Additional sample for Lake was taken and received on 02/03/2011 for the testing of Suspended Solids only (insufficient original Lake sample available).



Tweed Laboratory Centre

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

Lims1 Report No: 11/0567-C
 Date Testing Completed: 11/03/2011
 Date of Report: 11/03/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Date Received:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Date Testing Commenced:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Test	Method	Units	11/0567-C-1	11/0567-C-2	11/0567-C-3	11/0567-C-4	11/0567-C-5
pH	P1	pH units	4.5	6.2	6.6	6.9	6.6
Conductivity	P2	μScm^{-1}	59	128	7,057	349	281
*Redox Potential	P16	mV	+270	+261	+207	+203	+220
DO (membrane electrode)	P12	mg/L	1.3	5.9	0.1	2.0	<0.1
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:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Date Received:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Date Testing Commenced:			28/02/2011	28/02/2011	28/02/2011	28/02/2011	28/02/2011
Test	Method	Units	11/0567-C-6	11/0567-C-7	11/0567-C-8	11/0567-C-9	11/0567-C-10
pH	P1	pH units	4.9	7.0	7.6	4.8	5.0
Conductivity	P2	μScm^{-1}	146	299	3,201	92	167
*Redox Potential	P16	mV	+254	+216	-5	+140	+190
DO (membrane electrode)	P12	mg/L	2.0	5.1	<0.1	2.2	2.5
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: 11/0567-C
Date Testing Completed: 11/03/2011
Date of Report: 11/03/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample
Date Taken:			28/02/2011	28/02/2011
Date Received:			28/02/2011	28/02/2011
Date Testing Commenced:			28/02/2011	28/02/2011
Test	Method	Units	11/0567-C-11	11/0567-C-12
pH	P1	pH units	5.8	5.6
Conductivity	P2	μScm^{-1}	130	439
*Redox Potential	P16	mV	+253	--
DO (membrane electrode)	P12	mg/L	4.2	6.8
Turbidity	P8	ntu	--	11
Suspended Solids	P4	mg/L	--	13
Oil and Grease	C8	mg/L	--	<2
Total Phosphorus-P	C17	mg/L	--	11.00
Total-N	C7	mg/L	--	0.26

Chain of Custody Record

Analysis Request



Tweed Laboratory Centre

Tweed Laboratory Centre | 46 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph: 07 5569 3103 | Fax: 07 5524 2676 | E: admin@tweedlab.com.au

Company: RAMBOCH OIL

Address:

Contact Name:

Telephone: 02 6672 5582

Email: Fax:

Project Reference: MONTHLY TESTING

Purchase Order No:

Send Results to:

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner.

SAMPLE DESCRIPTION

ANALYSIS REQUIRED (please indicate if total and/or soluble)

Sample ID	Sample Date	Water	Soil	Comments	#	#	Redox	D	Time	SS	Oil	TD	Z	Algae
LAKE	28/11	/	/		/	/	/	/	/	/	/	/	/	/
DUP1		/	/		/	/	/	/	/	/	/	/	/	/
2		/	/		/	/	/	/	/	/	/	/	/	/
3		/	/		/	/	/	/	/	/	/	/	/	/
4		/	/		/	/	/	/	/	/	/	/	/	/
5		/	/		/	/	/	/	/	/	/	/	/	/
6		/	/		/	/	/	/	/	/	/	/	/	/
7, 8, 9, 10, 11		/	/		/	/	/	/	/	/	/	/	/	/

Special Requirements (eg. OHS issues etc.)

client advised DO outside THR.

Relinquished by (sig): Date: 28.2.11

Relinquished by (name): STEVE PEARSON Time: 15:00 hrs

Received by (sig): Date: 28.2.11

Received by (name): STEVE PEARSON Time: 15:00

Sample Receipt Advice (Lab Use Only)

All Samples Received in Good Condition

All Documentation in Proper Order

Samples Received Properly Chilled Ambient

Samples Received Within Recommended Holding Times X

For Enquires please quote Batch No. 11/05820

Subcontracted work:

Tweed Laboratory Centre



TWEED
SHIRE COUNCIL

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

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

Page 1 of 8

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

Lims1 Report No: 11/0884-C
Client Reference:
Date of Report: 08/04/2011

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:	25
Date Taken:	28/03/2011	Date Testing Commenced:	28/03/2011
Date Received:	28/03/2011	Date Testing Completed:	08/04/2011

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-SW 1
15	Lake-SW 2

Handwritten notes: A large blue bracket groups samples 1-11 with the word "Hydro". Another blue bracket groups samples 12-15 with the word "hydro".

NATA

TECHNICAL
COMPLIANCE

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025.
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: 61-65 Quarry Road
MURWILLUMBAH
NSW 2484
Attention: Steve Peterson

Line1 Report No: 11/0884-C
Date Testing Completed: 08/04/2011
Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample/Site No	Sample/Site Description
16	SW 3
17	SW 4
18	SW 5
19	SW 6
20	SW 7
21	SW 8
22	SW 9
23	SW 10
24	SW 11
25	SW 12



Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 61-65 Quarry Road

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 11/0884-C
Date Testing Completed: 08/04/2011
Date of Report: 08/04/2011

Sample Description: Duntoe 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.

No sample received for DLP 5.

NP = Not Present.



Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 61-65 Quarry Road

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 11/0884-C
Date Testing Completed: 08/04/2011
Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 1	DLP 2	DLP 3	DLP 4	DLP 5
Date Taken:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Received:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Testing Commenced:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Test	Method	Units	11/0884-C-1	11/0884-C-2	11/0884-C-3	11/0884-C-4	11/0884-C-5
pH	P1	pH units	5.6	6.0	6.6	6.7	--
Conductivity	P2	μScm^{-1}	193	124	6,994	362	--
*Redox Potential	P16	mV	+116	+144	+76	+89	--
Alkalinity as CaCO ₃	C10	mg/L	25	19	310	56	--
Bicarbonate HCO ₃	C10	mg/L	15	12	190	34	--
DO (membrane electrode)	P12	mg/L	<1.0	3.9	1	1.8	--
- 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	27	22	2,200	59	--
Calcium	M8	mg/L	1.9	4.4	66.0	1.7	--
Magnesium	M8	mg/L	3.3	3.3	104.0	2.1	--
Sodium	M8	mg/L	12.0	9.8	1,035.0	31.0	--
Potassium M8	M8	mg/L	6.0	<5.0	53.0	<5.0	--
Sulphur as Sulphate	M8	mg/L	31.0	5.5	133.0	9.9	--
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	--
Iron (Total)	M8	mg/L	7.80	4.42	0.09	0.59	--
Manganese	M8	mg/L	0.04	0.03	0.63	<0.01	--



Tweed Laboratory Centre

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

Lims1 Report No: 11/0884-C
 Date Testing Completed: 08/04/2011
 Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 6	DLP 7	DLP 8	DLP 9	DLP 10
Date Taken:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Received:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Testing Commenced:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Test	Method	Units	11/0884-C-6	11/0884-C-7	11/0884-C-8	11/0884-C-9	11/0884-C-10
pH	P1	pH units	3.7	7.6	6.9	4.3	4.7
Conductivity	P2	μScm^{-1}	544	3,235	290	163	93
*Redox Potential	P16	mV	+264	+107	+114	+204	+237
Alkalinity as CaCO ₃	C10	mg/L	NP	860	94	NP	1
Bicarbonate HCO ₃	C10	mg/L	NP	525	57	NP	<1
DO (membrane electrode)	P12	mg/L	7.4	<1.0	<1.0	4.1	2.7
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	24	930	24	15	16
Calcium	M8	mg/L	48.0	13.0	36.0	8.1	1.5
Magnesium	M8	mg/L	6.7	25.0	3.2	4.1	0.6
Sodium	M8	mg/L	11.0	377.0	12.0	8.7	7.8
Potassium M8	M8	mg/L	<5.0	34.0	<5.0	<5.0	<5.0
Sulphur as Sulphate	M8	mg/L	190.0	118.0	3.3	26.0	8.9
Arsenic (Total)	M7	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron (Total)	M8	mg/L	1.44	0.09	1.12	6.45	3.26
Manganese	M8	mg/L	0.36	0.10	0.12	0.10	0.02



Tweed Laboratory Centre

Client: Ramtech Pty Ltd

Address: 61-65 Quarry Road

MURWILLUMBAH
NSW 2484

Attention: Steve Peterson

Lims1 Report No: 11/0884-C

Date Testing Completed: 08/04/2011

Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			DLP 11	Lake Sample - 1 Metre	Lake Sample - 2 Metre	SW 1	SW 2
Date Taken:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Received:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Testing Commenced:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Test	Method	Units	11/0884-C-11	11/0884-C-12	11/0884-C-13	11/0884-C-14	11/0884-C-15
pH	P1	pH units	5.6	4.2	4.2	7.2	7.1
Conductivity	P2	μScm^{-1}	119	301	--	2,021	2,768
*Redox Potential	P16	mV	+236	--	--	--	--
Alkalinity as CaCO ₃	C10	mg/L	12	NP	--	--	--
Bicarbonate HCO ₃	C10	mg/L	7	NP	--	--	--
DO (membrane electrode)	P12	mg/L	2.1	7.8	--	6.2	6.7
Turbidity	P8	ntu	--	7.0	--	--	--
Suspended Solids	P4	mg/L	--	7.8	--	14	13
Oil and Grease	C8	mg/L	--	<2	--	--	--
Total Phosphorus-P	C17	mg/L	--	0.47	--	0.09	0.08
Total-N	C7	mg/L	--	0.54	--	0.51	0.52
Chloride	C20	mg/L	18	14	--	--	--
Calcium	M8	mg/L	1.5	27.0	--	--	--
Magnesium	M8	mg/L	1.6	3.6	--	--	--
Sodium	M8	mg/L	9.0	8.2	--	--	--
Potassium M8	M8	mg/L	<5.0	<5.0	--	--	--
Sulphur as Sulphate	M8	mg/L	8.2	88.0	--	--	--
Arsenic (Total)	M7	mg/L	<0.005	<0.005	--	--	--
Iron (Total)	M8	mg/L	7.94	0.73	--	--	--
Manganese	M8	mg/L	0.03	0.19	--	--	--



Tweed Laboratory Centre

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

Lims1 Report No: 11/0884-C
 Date Testing Completed: 08/04/2011
 Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 3	SW 4	SW 5	SW 6	SW 7
Date Taken:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Received:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Testing Commenced:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Test	Method	Units	11/0884-C-16	11/0884-C-17	11/0884-C-18	11/0884-C-19	11/0884-C-20
pH	P1	pH units	5.9	6.3	6.4	7.3	6.1
Conductivity	P2	μScm^{-1}	336	2,384	4,069	2,028	843
*Redox Potential	P16	mV	--	--	--	--	--
Alkalinity as CaCO ₃	C10	mg/L	--	--	--	--	--
Bicarbonate HCO ₃	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	4.6	6.2	5.7	7.6	6.5
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	14	7.3	24	14	17
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	<0.05	<0.05	<0.05	0.09	<0.05
Total-N	C7	mg/L	1.36	0.97	0.88	0.50	1.31
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	M8	mg/L	--	--	--	--	--



Tweed Laboratory Centre

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

Lims1 Report No: 11/0884-C
 Date Testing Completed: 08/04/2011
 Date of Report: 08/04/2011

Sample Description: Dunloe Sands Water Samples - Chemical

Sample Identification:			SW 8	SW 9	SW 10	SW 11	SW 12
Date Taken:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Received:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Date Testing Commenced:			28/03/2011	28/03/2011	28/03/2011	28/03/2011	28/03/2011
Test	Method	Units	11/0884-C-21	11/0884-C-22	11/0884-C-23	11/0884-C-24	11/0884-C-25
pH	P1	pH units	5.9	6.7	6.4	6.4	5.9
Conductivity	P2	μScm^{-1}	330	4,116	538	3,724	346
*Redox Potential	P16	mV	--	--	--	--	--
Alkalinity as CaCO ₃	C10	mg/L	--	--	--	--	--
Bicarbonate HCO ₃	C10	mg/L	--	--	--	--	--
DO (membrane electrode)	P12	mg/L	6.4	5.7	9.2	6.6	5.4
Turbidity	P8	ntu	--	--	--	--	--
Suspended Solids	P4	mg/L	11	12	45	12	176
Oil and Grease	C8	mg/L	--	--	--	--	--
Total Phosphorus-P	C17	mg/L	<0.05	<0.05	0.05	<0.05	0.11
Total-N	C7	mg/L	1.30	0.52	1.57	0.88	1.84
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	M8	mg/L	--	--	--	--	--

Chain of Custody Record

Analysis Request



Tweed Laboratory Centre

Tweed Laboratory Centre | 46 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph: 07 5569 3103 | Fax: 07 5524 2676 | E: admin@tweedlab.com.au

Company: **RAMTECH PTY LTD**

Project Reference: **DUMBLE SANDS**

Address:

Purchase Order No:

Contact Name:

Send Results to:

Fax:

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner

Sample ID	Sample Date	Water	Soil	Comments	ANALYSIS REQUIRED (please indicate if total and/or soluble)																			
					Ph	Ec	DO	Redox	Ca	Mg	Na	K	BC	Chloride	Alkalinity	Sulphate	Arsecnic	H ₂ O	Suspended Solids	Nitrogen	Phosphorus			
DLP 1-11	28/3	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
NOS N/A																								
SW 1-12		✓			✓																			
LAKE OIL + GREASE		✓																						
LAKE TOXICITY																								
LAKE BLUE GREEN ALGAE		✓																						

Special Requirements (eg. OHS issues etc.): *** DO NOT REMOVE SAMPLES FROM SITE**

Relinquished by (sig): *[Signature]* Date: **28/3**

Relinquished by (name): **STEVE GREGG**

Received by (sig): *[Signature]* Date: **28/3**

Received by (name): **GEORGE WELLS** Time: **10:15**

Sample Receipt Advice (Lab Use Only)

All Samples Received in Good Condition

All Documentation in Proper Order

Samples Received Properly Chilled

Samples Received Within Recommended Holding Times

For Enquiries please quote Batch No. **11/0884-C**

Subcontracted work: **N/A**

Tweed Laboratory Centre
TWEED
SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 8103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

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

Page 1 of 2

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

Lims1 Report No: 11/0177-A
Client Reference:
Date of Report: 24/01/2011

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: 21/01/2011	Date Testing Commenced: 21/01/2011
Date Received: 21/01/2011	Date Testing Completed: 24/01/2011

Sample Description: Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/0177-A/1	1	Dunloe Sands

COMMENTS:

Results refer to samples as received at the Laboratory.



This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. 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: 61-65 Quarry Road
MURWILLUMBAH

Attention: Steve Peterson

Lims1 Report No: 11/0177-A
Date Testing Completed: 24/01/2011
Date of Report: 24/01/2011

Sample Description: Dunloe Sands Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0177-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



Tweed Laboratory Centre

Chain of Custody Record
Analysis Request

Tweed Laboratory Centre | 46 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph: 07 5569 3103 | Fax: 07 5524 2676 | E: admin@tweedlab.com.au

Company: RANTICOR Pty Ltd Project Reference: DUNLOE SANDS

Address: _____ Purchase Order No: _____

Contact Name: _____ Fax: _____
Telephone: _____ Send Results to: _____
Email: _____

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner.

ANALYSIS REQUIRED (please indicate if total and/or soluble)

SAMPLE DESCRIPTION			ANALYSIS REQUIRED (please indicate if total and/or soluble)																	
Sample ID	Sample Date	Water	Soil																	
DUNLOE SANDS	21.1.11	✓																		

GREEN PLANT
BLUE PLANT

Special Requirements (eg. OHS issues etc.): _____

Sample Receipt Advice (Lab Use Only)

All Samples Received in Good Condition

All Documentation in Proper Order

Samples Received Properly Chilled @ ambient temp

Samples Received Within Recommended Holding Times

For Enquires please quote Batch No. 11/0177-A

Subcontracted work:

Please Note: Samples are to be received at the Laboratory no later than 4:30pm unless prior notification has been received (by 1:00pm) or additional charges may apply.

Relinquished by (sig): _____ Date: 21.1.11

Relinquished by (name): STEVE DEARBORN Time: 13:45 hrs

Received by (sig): _____ Date: 21/1/11

Received by (name): J. Martin Time: 1:30 pm

No logos added.

Tweed Laboratory Centre
TWEED
SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 173 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

FINAL REPORT OF ANALYSIS

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

Page 1 of 2

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

Lims1 Report No: 11/0237-A
Client Reference:
Date of Report: 27/01/2011

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:	27/01/2011	Date Testing Commenced:	27/01/2011
Date Received:	27/01/2011	Date Testing Completed:	27/01/2011

Sample Description: Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/0237-A/1	1	Dunloe Sands

COMMENTS:

Results refer to samples as received at the Laboratory.



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

**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:** 11/0237-A
Date Testing Completed: 27/01/2011
Date of Report: 27/01/2011

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0237-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100

Chain of Custody Record
Analysis Request



Tweed Laboratory Centre

Tweed Laboratory Centre | 48 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph 07 5568 3103 | Fax 07 5524 2676 | E. admin@tweedlab.com.au

Project Reference:

KAMTECH SYDNEY
1/A DUNLOE SANDS

Purchase Order No:

Send Results to:

Fax:

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner.

SAMPLE DESCRIPTION		ANALYSIS REQUIRED (PLEASE INDICATE IN ORDER OF PRIORITY)	Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner.															
Sample ID	Sample Date	Water	Soil	Comments	TPH	EC	DO	TURB	SS	TOTAL NITROGEN	TOTAL PHOSPHORUS	AMMONIA	NO3-N	NO2-N	CO2	ALGAE	OTHER	
LAKE	2/11	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
DLO 1-11	"	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
ALGAE LAKE	"	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Special Requirements (eg. OHS issues etc.):

Sample Receipt Advice (Lab Use Only)

Relinquished by (sig): *[Signature]* Date: 27/1/11
 Relinquished by (name): STEVE CARTER Time: 12:30
 Received by (sig): *[Signature]* Date: 27/1
 Received by (name): CKJ Time: 12:30

All Samples Received in Good Condition
 All Documentation in Proper Order
 Samples Received Properly Chilled
 Samples Received Within Recommended Holding Times
 For Enquires please quote Batch No. 10/0230
 Subcontracted work:

Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

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

Page 1 of 2

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

Lims1 Report No: 11/0404-A
Client Reference:
Date of Report: 15/02/2011

All pages of this Report have been checked and approved.
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Taken By:	Client	No of Samples:	1
Date Taken:	14/02/2011	Date Testing Commenced:	14/02/2011
Date Received:	14/02/2011	Date Testing Completed:	14/02/2011

Sample Description: Dunloe Sands Water Sample - Algae


LIMS NO.	Sample/Site No	Sample/Site Description
11/0404-A/1	1	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.



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

**Tweed Laboratory Centre**

Client: Ramtech Pty Ltd

Address: 61-65 Quarry Road
MURWILLUMBAH

Attention: Steve Peterson

Lims1 Report No: 11/0404-A
Date Testing Completed: 14/02/2011
Date of Report: 15/02/2011

Sample Description: Dunloe Sands Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0404-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



Tweed Laboratory Centre



Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South, NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council, PO Box 816 Murwillumbah, NSW 2484)
www.tweedlab.com.au

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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6672 3898

Lims1 Report No: 11/0567-A
Client Reference:
Date of Report: 01/03/2011

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: 28/02/2011	Date Testing Commenced: 28/02/2011
Date Received: 28/02/2011	Date Testing Completed: 01/03/2011

Sample Description: Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/0567-A/1	1	Lake

COMMENTS:

Results refer to samples as received at the Laboratory.

TECHNICAL
 COMPETENCE

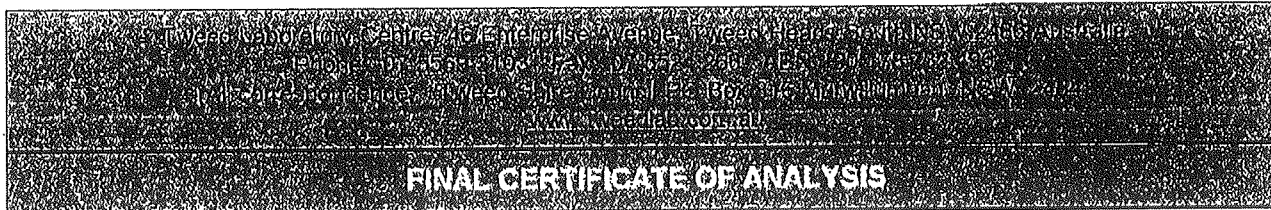
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Sally Everson
 (Senior Technical Officer - Phycology)
sallye@tweed.nsw.gov.au

**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:** 11/0567-A
Date Testing Completed: 01/03/2011
Date of Report: 01/03/2011

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0567-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100

Tweed Laboratory Centre



FINAL CERTIFICATE OF ANALYSIS

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

Page 1 of 2

Attention: Steve Peterson
Copy To: Fax: 02 6872 3896

Lims1 Report No:
Client Reference:
Date of Report:

11/0782-A
 21/03/2011

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:	18/03/2011	Date Testing Commenced:	18/03/2011
Date Received:	18/03/2011	Date Testing Completed:	18/03/2011

Sample Description: Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/0782-A/1	1	Lake

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

**Tweed Laboratory Centre****Client:** Ramtech Pty Ltd**Address:**
61-65 Quarry Road
MURWILLUMBAH**Attention:** Steve Peterson**Lims1 Report No:** 11/0782-A
Date Testing Completed: 18/03/2011
Date of Report: 21/03/2011**Sample Description:** Dunloe Sands Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0782-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



Tweed Laboratory Centre



TWEED
SHIRE COUNCIL

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 2076 Email: sample.reception@tweed.nsw.gov.au ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

Page 1 of 2

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

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

Lims1 Report No: 11/0883-A
Client Reference:
Date of Report: 28/03/2011

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Taken By:	Client	No of Samples:	1
Date Taken:	28/03/2011	Date Testing Commenced:	28/03/2011
Date Received:	28/03/2011	Date Testing Completed:	28/03/2011

Sample Description: Dunloe Sands Water Sample - Algae

LIMS NO.	Sample/Site No	Sample/Site Description
11/0883-A/1	1	Lake


COMMENTS:

Results refer to samples as received at the Laboratory.

NATA

TECHNICAL
COMPETENCE

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

**Tweed Laboratory Centre**

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

Lims1 Report No: 11/0883-A
Date Testing Completed: 28/03/2011
Date of Report: 28/03/2011

Attention: Steve Peterson

Sample Description: Dunloe Sands Water Sample - Algae

	Algal Identification	Method Code	Units	Count
LIMS NO.	11/0883-A/1			
	Mixed Algae (No Cyanophyta Detected)	B9	cells/mL	<100



Tweed Laboratory Centre

Chain of Custody Record
Analysis Request

Tweed Laboratory Centre | 46 Enterprise Avenue, Tweed Heads South NSW 2486 | Ph: 07 5569 3103 | Fax: 07 5524 2676 | E: admin@tweedlab.com.au

Company: **RANTECA PTY LTD**

Project Reference: **DAMES SAN OS**

Address:

Purchase Order No:

Contact Name:

Send Results to:

Fax:

Turnaround time for results is within 10 working days for most samples. Additional charges may apply if required sooner

SAMPLE DESCRIPTION		ANALYSIS REQUIRED (please indicate if total and/or soluble)																				
Sample ID	Sample Date	Water	Soil	Comments	Ph	Ec	DO	Redox	Ca	Mg	Na	K	BC	Chloride	Alkalinity	Sulphate	Ammonia	Fe	Sulphate Soluble	Nitrogen	Phosphorus	
DLP1-11	28/3	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
NOS N/A																						
SW 1-12		✓			✓	✓	✓															
LAKE OIL+GREASE		✓			✓																	
Turbidity					✓																	
LAKE Benthic Invertebrates		✓			✓																	

Special Requirements (eg. OHS issues etc.)
* DO + REDOX should be done on site.

Sample Receipt Advice (Lab Use Only)
 All Samples Received in Good Condition
 All Documentation in Proper Order
 Samples Received Properly Chilled
 Samples Received Within Recommended Holding Times X
 For Enquires please quote Batch No. 110883-A
 Subcontracted work: 110883-A

Relinquished by (sig): *[Signature]* Date: 28/3
 Relinquished by (name): STEVE ESPINOSA

Received by (sig): *[Signature]* Date: 28/3
 Received by (name): GAVIN WELLS Time: 10:15

Please Note: Samples are to be received at the Laboratory no later than 4:30pm unless prior notification has been received (by 1:00pm) or additional charges may apply.

Tweed Laboratory Centre

Tweed Laboratory Centre, 46 Enterprise Avenue, Tweed Heads South NSW 2486 Australia
 Phone: 07 5569 3103 Fax: 07 5524 266 ABN: 90 178 732 496
 (All correspondence: Tweed Shire Council PO Box 816 Murwillumbah NSW 2484)
www.tweedlab.com.au

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

Page 1 of 2

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

Lims1 Report No: 10/2256-S
Client Reference:
Date of Report: 1/10/2010

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

Taken By: Client
Date Taken: 21/09/2010
Date Received: 21/09/2010

No of Samples: 2
Date Testing Commenced: 21/09/2010
Date Testing Completed: 1/10/2010

Sample Description: Dunloe Sands - Soil Sample - ASS Chromium

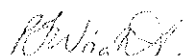
Sample/Site No	Sample/Site Description
1	Sand
2	Sandy Loam

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@tweedlab.com.au

Tweed Laboratory Centre

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

Lims1 Report No: 10/2256-S
Date Testing Completed: 1/10/2010
Date of Report: 1/10/2010

Sample Description: Dunloe Sands - Soil Sample - ASS Chromium

Sample Identification:			Sand	Sandy Loam
Date Taken:			21/09/2010	21/09/2010
Date Received:			21/09/2010	21/09/2010
Date Testing Commenced:			21/09/2010	21/09/2010
Test	Method	Units	10/2256-S-1	10/2256-S-2
SCR	ASS7	%	0.07	0.01
TAA	ASS2	molH ⁺ /t	8.0	38
pH - ASS Cr Reducible	ASS2	pH units	5.5	5.2



Appendix D Acoustic Certification





CARTER RYTENSKILD GROUP
Traffic and Acoustical Consultants

GOLD COAST

2563 Gold Coast Highway
Mermaid Beach Queensland 4218

POSTAL:
PO Box 441
Mermaid Beach Queensland 4218

P: (07) 5527 7333
F: (07) 5527 7555

E: info@crg.net.au
CRG Traffic & Acoustics Pty Ltd

BRISBANE

Level 36, Riparian Plaza
71 Eagle Street
Brisbane Queensland 4000

POSTAL:
Level 36, Riparian Plaza
71 Eagle Street
Brisbane Queensland 4000

P: (07) 3121 3198
F: (07) 3121 3030

www.crg.net.au
ABN 47 553 772 655

11th April 2011

CRGref: 06362a Letter 11_04_11

Ramtech Pty Ltd
C/- Mr. Adam Smith,
Planit Consulting
P O Box 1632
KINGSCLIFF NSW 2487

Dear Adam,

RE: Dunloe Sands Operational Noise Measurements at Stage 1, Pottsville Road Pottsville

Thank you for your request for CRG to complete operation noise measurements at the Dunloe Sands Stage 1 Sandmine located along Pottsville Road at Pottsville. The following outlines the results of the attended measurements:

1.0 Attended Measurements

Attended measurements of onsite equipment and ambient noise levels were conducted on the Morning of Monday 11th April between 7am and 8:30am at near field measurements at the equipment locations and measurements at the common boundaries with the nearest offsite noise sensitive receivers.

Measurements were conducted with a Rion 29E Octave Band Sound Level Meter over the octave band centre frequencies between 31.5 Hz to 8,000 Hz. Measurements were conducted in "A" weight with the microphone in a free-field location approximately 1.2m above ground and pointing towards the noise source.

Measurements were conducted generally in accordance with Australian Standard AS 1055:1997 – "*Acoustics-Description and measurement of environmental noise*". The operation of the sound level equipment was field calibrated before and after the measurement session, with no significant drift from the reference signal recorded.

Weather conditions during the survey periods were fine and calm with wind speeds less than 5m/s.

The results of the near field measurements and the measurements at the common boundaries with the offsite nearest noise sensitive receivers are presented in Table 1 over the page.

We note that during measurements at the common boundary with the offsite noise sensitive receivers all equipment was in operation (i.e. dredge, screen and loader).



Equipment	Distance To Source	SPL Hz Octave Band Centre Frequencies dB(A)									
		31.5	63	125	250	500	1k	2k	4k	8k	AP
(1) Stage 1 Dredge	50m	27	38	43	45	52	53	49	42	33	57
(2) Volvo L150F Loader	10m	35	61	59	62	65	59	59	55	46	69
(2) CAT Truck with Dog Trailer	3m	40	55	65	68	71	68	65	59	51	75
(3) Powerscreen 1400 Loader	7m 15m	48	56	65	67	71	74	71	69	61	78
(3) Loader tipping sand into Powerscreen 1400	7m	48	63	62	69	72	74	72	71	63	79
(4) Powerscreen 1400 and Loader on other side of constructed earth bund	25m	30	48	43	46	50	51	50	44	32	56
(5): Impact to South Boundary		Inaudible									
(6): Impact to North Boundary		Inaudible									
(5): Background L _{A90} South		12	26	27	29	37	35	34	35	32	43
(6): Background L _{A90} North		11	20	25	27	32	31	23	24	29	38

(1): Refer to Figure 1 below for measurement locations.

Table 2: Attended measurement results.

Figure 1: Aerial of Sand Mine and Measurement Locations



2.0 Predicted Impact Levels from Near-field Source Levels

Given that the onsite equipment was observed to be inaudible at the common boundaries with the nearest offsite receivers (i.e. dwellings) predictions of impacts have been determined from the measured near-field source levels. It is noted that the nearest dwellings to the south and west are at least 1.0 km away from the nearest onsite equipment, with the nearest northern common boundary at least 1.2 km away.

Noise predictions have assumed a minus 6 dB reduction for every doubling of distance and an 8 dB reduction for the constructed earth mound (for the southern and western dwellings). We note from the measured levels the earth bund provided approximately 11 dB reduction (at 25m from the source); however, given that the offsite receivers are further away and higher than the measurement location at 25m we have applied a minus 8 dB reduction for the earth mound. The predicted combined impacts from all plant are as follows:

Southern Dwellings:	33 dB(A) at façade (28 dB(A) inside);
Western Dwellings:	33 dB(A) at façade (28 dB(A) inside); and
Northern Dwellings:	35 dB(A) at façade (33 dB(A) inside).

Refer to calculation sheet at the rear of this letter.

3.0 Noise Criterion

The noise criterion determined from the previous acoustic report for the development (crgref: 06362a report March 2008) is as follows:

- Daytime (7am to 6pm) 48 dB(A) L_{eq} (RBL + 5 dB).

From onsite attended measurements of Background L_{A90} levels conducted on 11th April 2011 at the northern and southern site boundaries (refer to the presented Levels in Table 1 of this letter) the following Background criterion would apply:

Southern and Western Dwellings:	43 L_{A90} dB(A) + 5 dB = 48 dB(A); and
Northern Dwellings:	38 L_{A90} dB(A) + 5 dB = 43 dB(A).

Overall both the measured levels and predicted levels are below the noise criterion for the development; therefore, operational activities occurring at the sand mine are in compliance.

We trust the above is of assistance; please do not hesitate to contact the undersigned regarding any queries in relation to the above information.

Letter Reviewed By:



JAY CARTER BSc
Director

Letter Compiled by:



Matthew Lopez BEng
Consultant

APPENDIX

Model Calculations / Predictions



ONSITE ACTIVITY NOISE IMPACTING:

Dwellings due south

Dredge	57	dB(A) @ 50m
Distance source to receiver	1000	m
Distance attenuation	-26.0	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	31.0	dB(A)
Impact inside open window	26.0	dB(A)

Dwellings due west

Dredge	57	dB(A) @ 50m
Distance source to receiver	1000	m
Distance attenuation	-26.0	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	31.0	dB(A)
Impact inside open window	26.0	dB(A)

Dwellings due North

Dredge	57	dB(A) @ 50m
Distance source to receiver	1350	m
Distance attenuation	-28.6	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	28.4	dB(A)
Impact inside open window	23.4	dB(A)

Screen and loader	79	dB(A) @ 7m
Distance source to receiver	1050	m
Distance attenuation	-43.5	dB(A)
Earth bound screening	-8	dB(A)
Façade reflection	0	dB(A)
Impact at façade	27.5	dB(A)
Impact inside open window	22.5	dB(A)

Screen and loader	79	dB(A) @ 7m
Distance source to receiver	1000	m
Distance attenuation	-43.1	dB(A)
Earth bound screening	-8	dB(A)
Façade reflection	0	dB(A)
Impact at façade	27.9	dB(A)
Impact inside open window	22.9	dB(A)

Screen and loader	79	dB(A) @ 7m
Distance source to receiver	1300	m
Distance attenuation	-45.4	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	33.6	dB(A)
Impact inside open window	28.6	dB(A)

Truck with dog trailer	75	dB(A) @ 3m
Distance source to receiver	1100	m
Distance attenuation	-51.3	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	23.7	dB(A)
Impact inside open window	18.7	dB(A)

Truck with dog trailer	75	dB(A) @ 3m
Distance source to receiver	1000	m
Distance attenuation	-50.5	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	24.5	dB(A)
Impact inside open window	19.5	dB(A)

Truck with dog trailer	75	dB(A) @ 3m
Distance source to receiver	1200	m
Distance attenuation	-52.0	dB(A)
Screening	0	dB(A)
Façade reflection	0	dB(A)
Impact at façade	23.0	dB(A)
Impact inside open window	18.0	dB(A)

Combined impact at façade	33.1	dB(A)
Impact inside open window	28.1	dB(A)

Combined impact at façade	33.3	dB(A)
Impact inside open window	28.3	dB(A)

Combined impact at façade	35.0	dB(A)
Impact inside open window	30.0	dB(A)