

NEWCASTLE COAL INFRASTRUCTURE GROUP  
COAL EXPORT TERMINAL

ANNUAL ENVIRONMENTAL MANAGEMENT REPORT  
2012



**December 2012**

Revision 1

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**LIST OF ATTACHMENTS**

Attachment A	Dust Deposition Monitoring Results
Attachment B	Surface Water Monitoring Results

## 1 INTRODUCTION

This Annual Environmental Management Report (AEMR) has been prepared for the Newcastle Coal Infrastructure Group (NCIG) Coal Export Terminal project (the Project) in accordance with the conditions of the approved Construction Environmental Management Plan (CEMP) and Operation Environmental Management Plan (OEMP) (Sections 5.2 and 7.2 respectively). The CEMP was prepared in accordance with Condition 7.2 and the OEMP was prepared in accordance with Condition 7.5, both within Schedule 2 of the Project Approval (06\_0009) which was granted on 13 April 2007.

This is the fourth AEMR prepared for the NCIG Project and it covers the period April 2011 to March 2012 (i.e. a 12 month period), which includes the second year of terminal operation and Stage 2AA construction of the Project.

The AEMR reviews the performance of the Project against the requirements of the Project Approval and provides an overview of environmental management actions and summarises monitoring results over the 12 month reporting period. The AEMR will be distributed to relevant government agencies and stakeholders, and copies provided to other interested parties, if requested.

Dredging operations by NCIG were recommenced in May 2011, after a break of around 8 months. These activities and related environmental management are not the subject of this AEMR. Only the environmental management requirements of both the CEMP and the OEMP, which are associated with the terrestrially based coal export terminal operation and construction activities, are detailed by this AEMR. Details of the compliance of dredging activities are outlined in separate reports.

### 1.1 APPROVALS, LEASES, LICENCES AND PERMITS

The Project is being undertaken under the approvals, leases, licences and permits presented in Table 1.

**Table 1: Project Approval, Leases, Licences and Permits**

Instrument	Relevant Authority	Date Granted	Duration of Approval
Project Approval (06_0009)	Department of Planning and Infrastructure	13 April 2007	5 years unless substantially commenced
Project Lease	State Property Authority	22 January 2008	35 years
Environmental Protection Licence (EPL) (No. 12693)	NSW Environment Protection Authority	26 October 2007	Until the licence is surrendered or revoked. The licence is subject to review every 5 years.
Environment Protection and Biodiversity Conservation Act 1999	Department of the Environment and Heritage	11 October 2007	Perpetuity
Maritime Services Act 1935 s13JE	NSW Roads and Maritime Services	02 October 2007	Perpetuity
Environmental Representative	Department of Planning and Infrastructure	03 October 2007	Perpetuity
Project Ecologist	Department of Planning and Infrastructure	02 May 2007 & 25 October 2007	Perpetuity

## 1.2 MANAGEMENT PLANS AND MONITORING PROGRAMMES

In accordance with the Project Approval, the Project is currently being undertaken under a number of environmental management plans and monitoring programmes, including:

### Construction Management Plans and Protocols

- Construction Environmental Management Plan
- Construction Noise Management Plan
- Construction Surface Water Management Plan, including Erosion and Sediment Control Plan
- Construction Traffic Management Protocol
- Acid Sulphate Soil Management Plan
- Vegetation Clearance Protocol

### Operations Management Plans

- Operation Environmental Management Plan
- Operation Dust Management Plan
- Operation Noise Management Plan
- Operation Spontaneous Combustion Management Plan
- Operation Water Management Plan

### Other Management Plans and Programs

- Site Water Management Plan
- Green and Golden Bell Frog Management Plan
- Compensatory Habitat and Ecological Monitoring Program
- Coordinated Works Program
- Compliance Tracking Program

### Monitoring Programmes

- Environmental Monitoring Programme
- Surface Water Monitoring Programme
- Green and Golden Bell Frog Monitoring Programme
- Avifauna Monitoring Programme

### 1.3 PROJECT CONTACTS

Contact Details for the Project are provided below:

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### 1.4 PROJECT BACKGROUND

The Newcastle Coal Infrastructure Group (NCIG) Coal Export Terminal (CET) (the Project) is located on Kooragang Island in Newcastle, New South Wales (NSW) (Figure 1.1). The Project includes the construction and operation of a CET up to 66 million tonnes per annum (Mtpa), including associated rail and coal handling infrastructure and wharf/shiploading facilities on the south arm of the Hunter River.

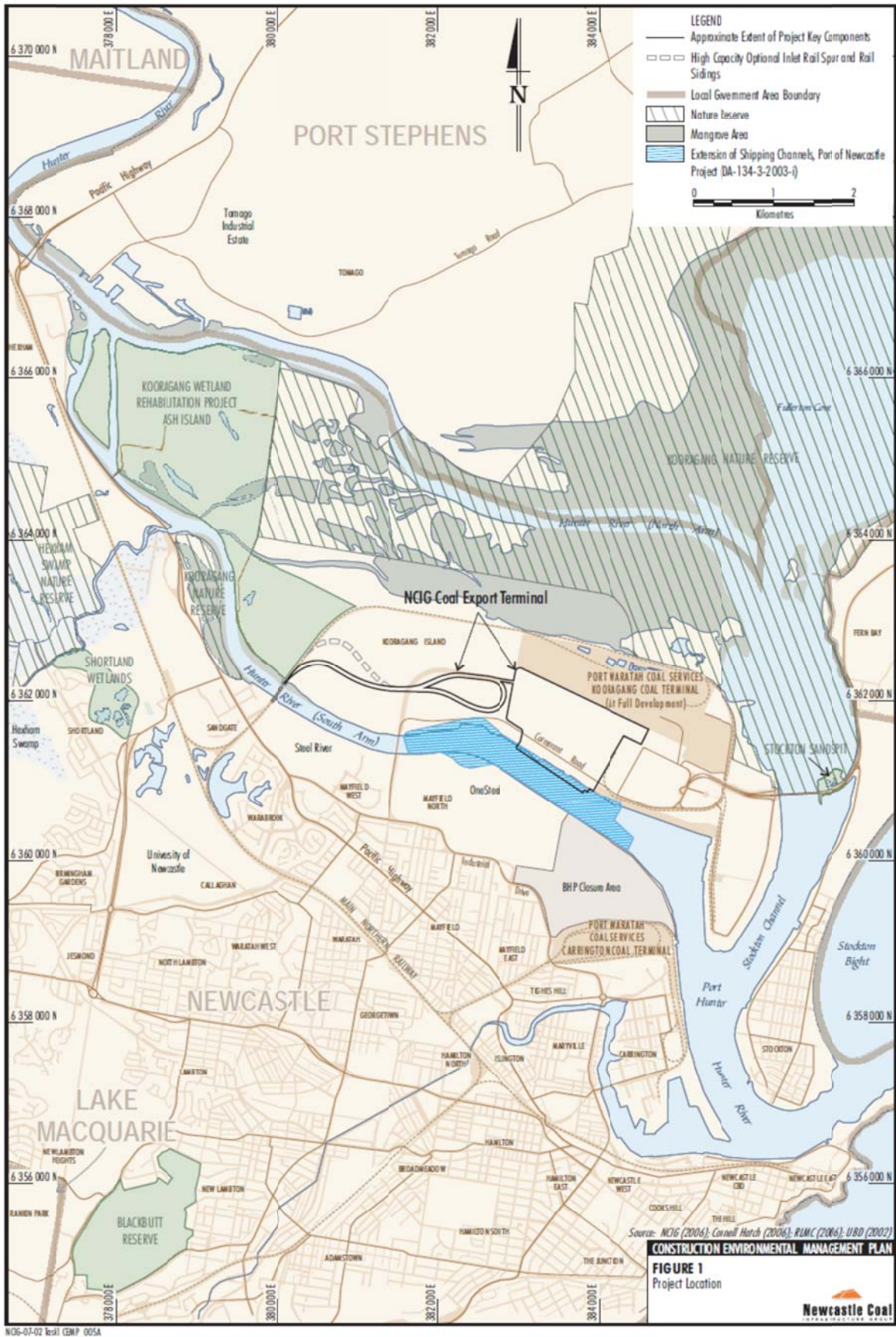


Figure 1.1: Project Location

NCIG is the proponent of the Project and is a consortium of the following five companies:

- Hunter Valley Energy Coal Limited;
- Centennial Coal Company Limited;
- Peabody Energy Australia Coal Pty Limited;
- Yancoal Australia Limited; and
- Whitehaven Coal Mining Pty Ltd.

NCIG was formed in response to a call for Expressions of Interest for the development of land on Kooragang Island by the NSW State Government in 2004. The outcome of this process was that in 2006 NCIG was awarded the right to develop the parcel of land that is now the Project site. Project Approval (06\_0009) was granted in April 2007 and construction of Stage 1 of the coal export terminal (30 Mtpa) commenced in April 2008. Stage 1 of construction is completed and was subsequently handed to NCIG for operation in July 2010. Stage 2AA construction commenced in the first half of 2010 and was approximately 90% complete at the end of March 2012.

The Project general arrangement is shown on Figure 1.2. The general arrangement is based on the planned maximum coal throughput of 66 Mtpa. The main activities associated with the construction of the Project include:

- dredged materials from the south arm of the Hunter River to facilitate access to wharf facilities (*NB/ NCIG dredging during the reporting period (Stage 2AA) did not include re-use of dredge material for construction. This material is alternatively dumped offshore under the requirements of Sea Dump Permit SD2007/00382*);
- construction of a coal storage area including coal stockpiles, conveyors, transfer points and combined stacker/reclaimers;
- construction of wharf facilities, shiploaders, conveyors and buffer bins;
- foundation preparation, formation construction and capping of a rail corridor traversing the existing Kooragang Island Waste Emplacement Facility (KIWEF) for the development of the rail spurs, rail sidings and rail loops;
- construction of rail spurs, rail sidings and rail loops, rail overpass, train unloading stations and connecting conveyors;
- development of water management infrastructure including site drainage works, stormwater settlement ponds, primary and secondary settling ponds, site water pond, water tanks and stockpile spray system;
- installation of electricity reticulation and control systems;
- development of access roads and internal roads;
- construction of administration and workshop buildings; and
- other associated minor infrastructure, plant, equipment and activities.

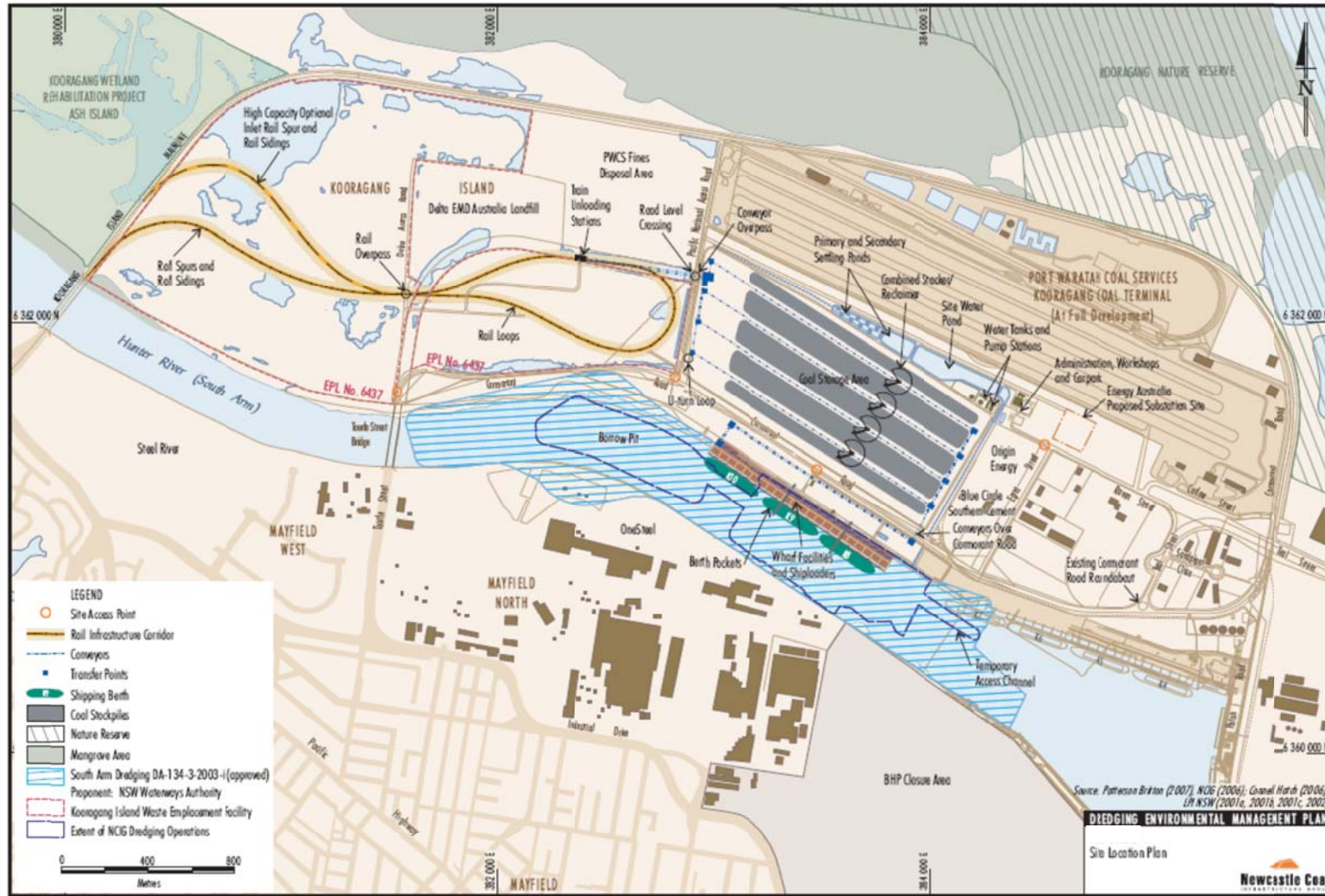


Figure 1.2: Project Layout

## 2 OVERVIEW OF ACTIVITIES

### 2.1 OPERATION

April 2011 to March 2012 reporting period included a continuation of Stage 1 operations. This specifically included operation of Dump Station 1, Stacker/Reclaimers 1 and 2 and Shiploader 1, along with associated inbound and outbound conveyor systems. The operational throughput and major milestones achieved in this reporting period include:

- First Cape Size Vessel loaded – October 2011
- Coal received - 18.1 Million tonnes
- Coal shipped - 18.1 Million tonnes



**Figure 2.1: Train Arrival and Departure at NCIG Terminal**



**Figure 2.2: Stockyard Dust Suppression Sprays in operation at NCIG Terminal**



**Figure 2.3: SR02 Reclaiming at NCIG Terminal**



**Figure 2.4: Stacking over SR02 at NCIG Terminal**



**Figure 2.5: Train entering Dump Station 1**



Figure 2.6: Shiploader 1 in operation at K9 Wharf

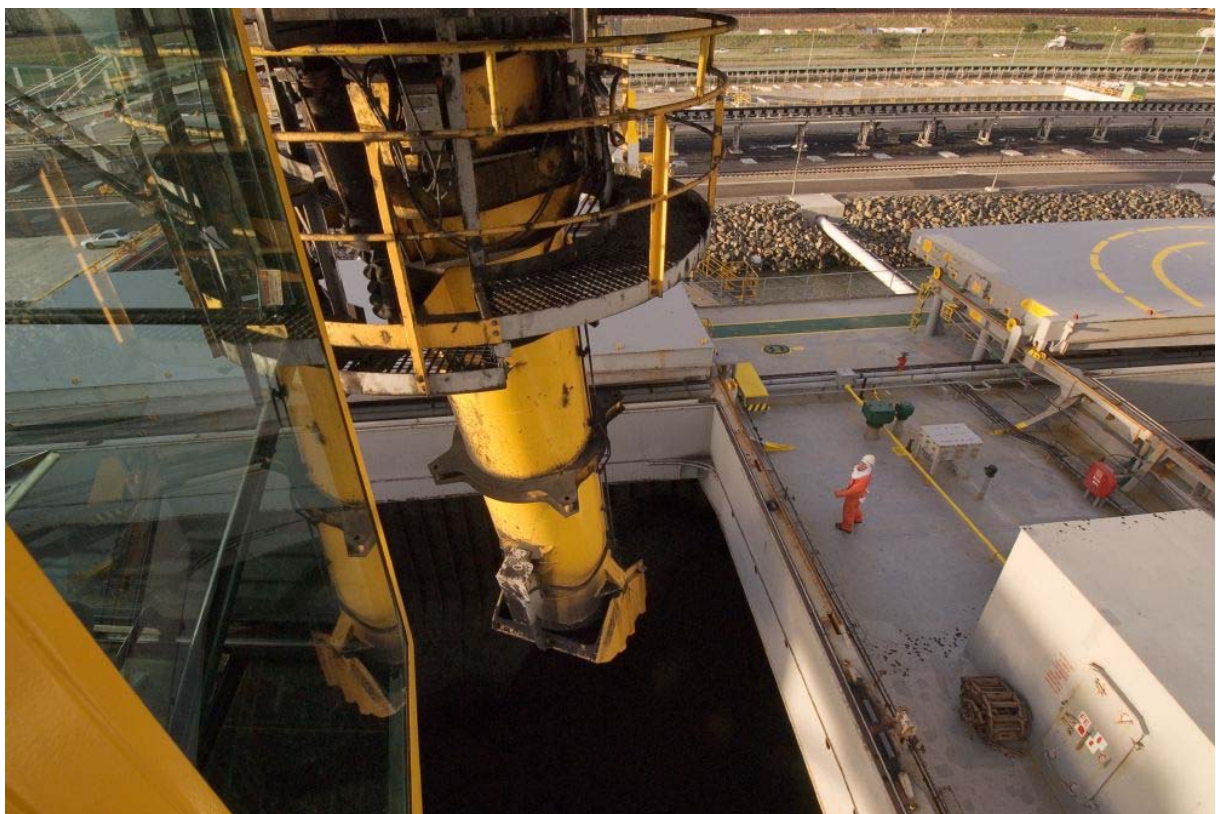


Figure 2.7: Spout of Shiploader 1 in ship hatch

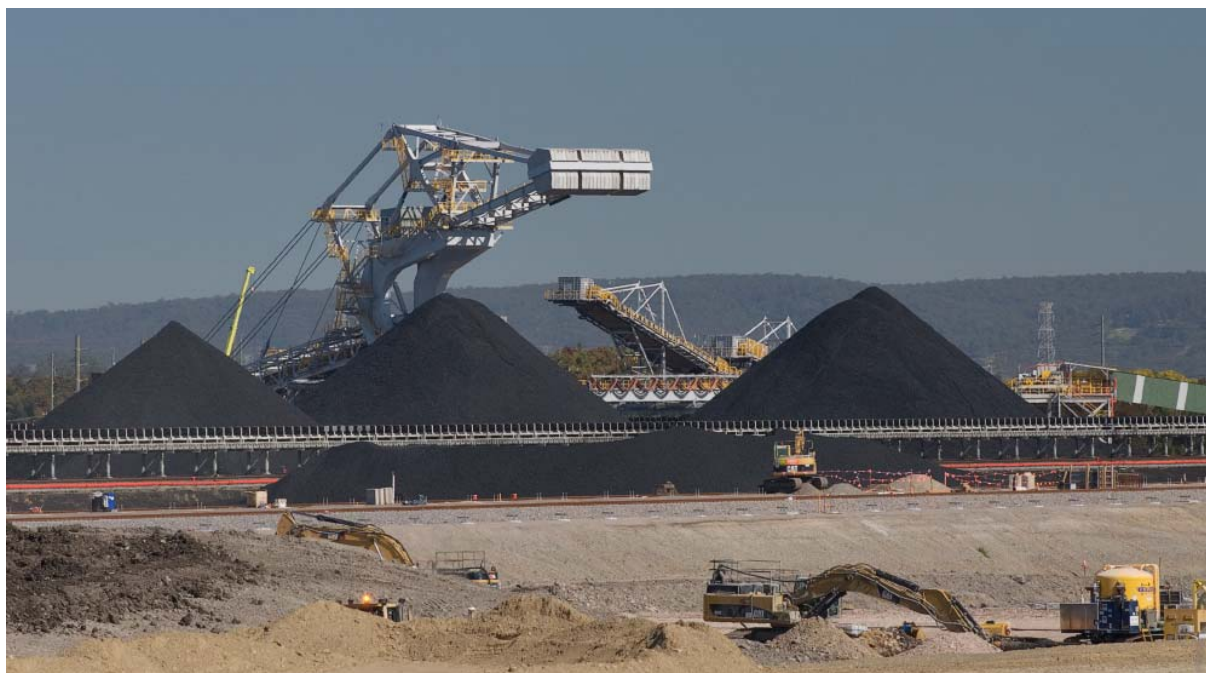


Figure 2.8: Overview of NCIG Terminal (June 2011)

## 2.2 CONSTRUCTION

Construction activities during this reporting period were entirely associated with Stage 2AA. A number of milestones and specific activities associated with construction included:

- Continuation of Stage 2AA ground improvement works (Figure 2.9).
- Supply of material for dynamic replacement.
- Construction, onsite assembly and commissioning of the Shiploader 2 and Stacker/Reclaimer 3 (Figures 2.11, 2.22 and 2.25).
- SR03 Berm construction and associated rail construction (Figure 2.20).
- Construction of yard conveyor 10 (Figure 2.16).
- Construction of the second inbound and outbound conveyor systems (Figures 2.12 and 2.18).
- Construction of inbound and outbound concrete structures.
- Construction of Dump Station 2 (Figure 2.13).
- Construction of second Rail Delivery Track (Figure 2.21).
- Delivery of viaduct panels and planks for duplicate rail (Figure 2.14).
- Piling for conveyors 2, 6, 10, 16 and 19.
- Construction of Buffer Bin 2 (Figure 2.24).
- Inbound and outbound structural and mechanical installations.
- Construction of Sample Stations 2 and 5.
- Construction of Transfer Houses 4 and 8 (Figures 2.17 and 2.23).
- Extension of Transfer Houses 1, 7, 10 and 12 (Figures 2.15 and 2.19).
- Associated electrical installations, including switchrooms, and underground services



**Figure 2.9: Earthworks for SR03 and Stockpad 4**



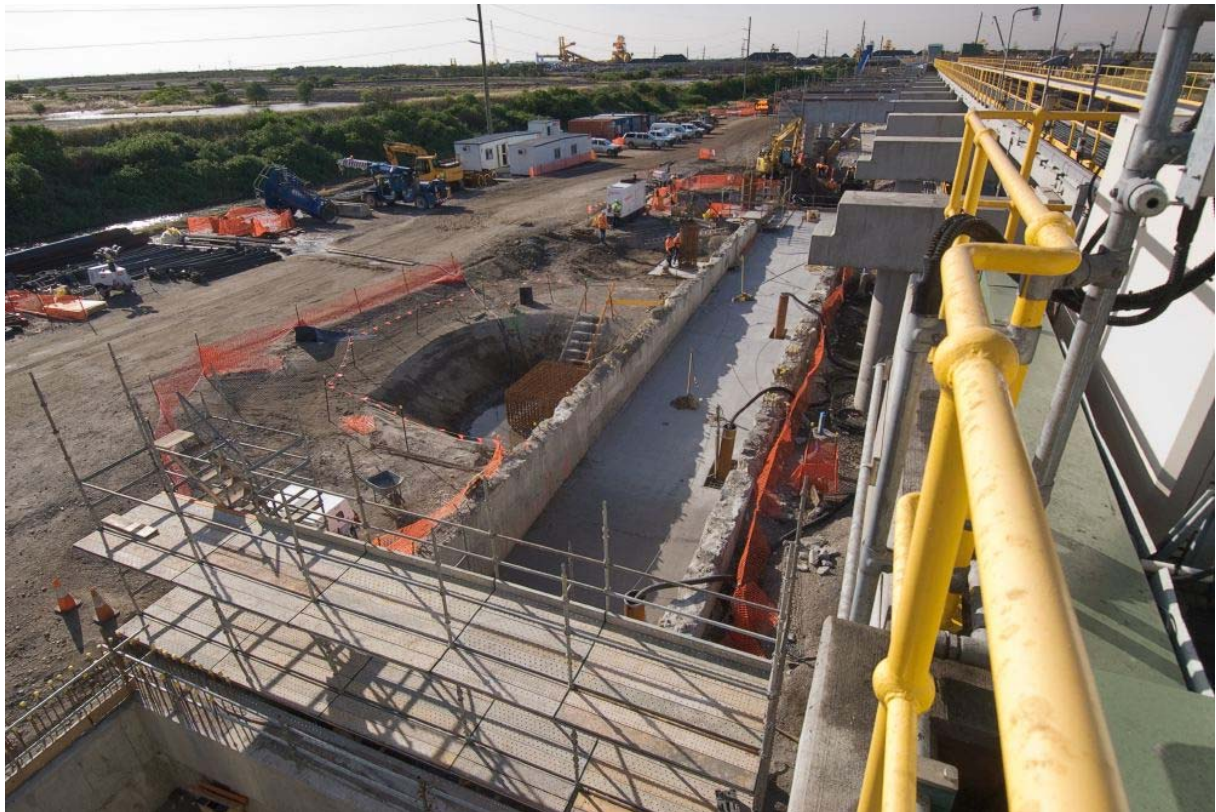
Figure 2.10: Ship delivery of SR03 components



Figure 2.11: Road delivery of SR03 components



**Figure 2.12: Construction of CV22 and extension of TH12**



**Figure 2.13: CV02 Tunnel construction, under DS02**



**Figure 2.14: Extension of Viaduct for duplication of rail track**



**Figure 2.15: Extension of TH01**



**Figure 2.16: Concrete piling for CV10**



**Figure 2.17: Construction of TH04**



**Figure 2.18: Construction of CV16**



**Figure 2.19: Extension of TH07**



**Figure 2.20: SR03 Rail Track**



**Figure 2.21: Piling/Viaduct for duplication of rail track**



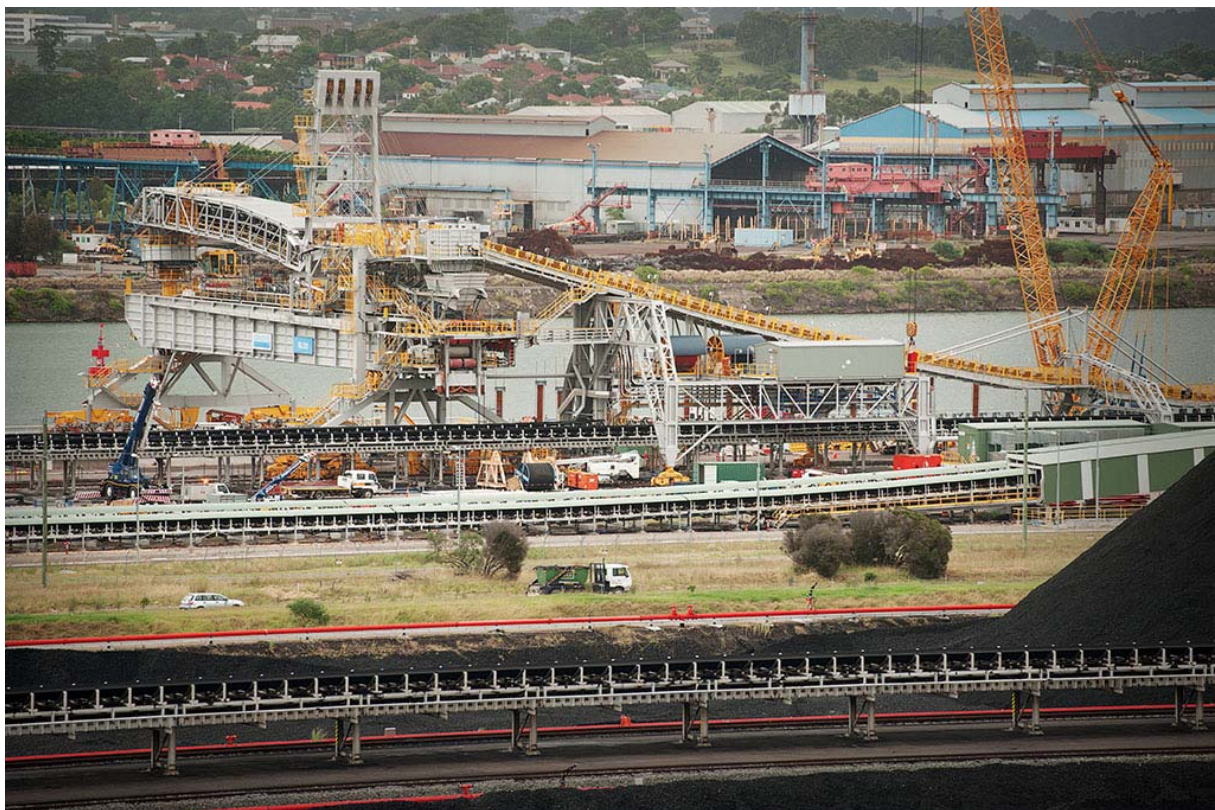
**Figure 2.22: SR03 assembly**



**Figure 2.23: Construction of TH08**



**Figure 2.24: Construction of BN02 and CV13 gallery**



**Figure 2.25: Construction of SL02**



Figure 2.26: March 2011 Aerial Photograph of Project



Figure 2.27: March 2012 Aerial Photograph of Project

### 3 ENVIRONMENTAL MANAGEMENT AND PERFORMANCE

#### 3.1 METEOROLOGY

##### 3.1.1 Environmental Management

In accordance with Condition 2.8, Schedule 2 of the Project Approval (06\_0009), an on-site meteorological monitoring station was operated during the reporting period to monitor weather conditions representative of the site. This station was installed on the NCIG site (see Figure 3.1.1) in accordance with the requirements of the CEMP.

##### 3.1.2 Environmental Performance

Table 3.1.1 outlines the monitoring locations, meteorological parameters recorded and frequency of monitoring for the Project in accordance with the CEMP.

**Table 3.1.1: Summary of the Meteorological Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
<ul style="list-style-type: none"> <li>• Temperature</li> <li>• Relative humidity</li> <li>• Net solar radiation</li> <li>• Rainfall</li> <li>• Wind speed and direction</li> <li>• Sigma theta (rate of change of wind direction).</li> </ul>	Project automated meteorological station <sup>1</sup> .	Continuously monitored and the data averaged over 15 minute periods.	N/A.

<sup>1</sup> The location of monitoring sites is shown on Figure 3.1.1.

The meteorological monitoring results for the reporting period are summarised below.

The monthly statistical information for each of the meteorological monitoring parameters is detailed in Table 3.1.2. From this information Figure 3.1.2 illustrates the variation in average temperature during the reporting period. These variations from the winter to summer seasons are the expected seasonal norms.

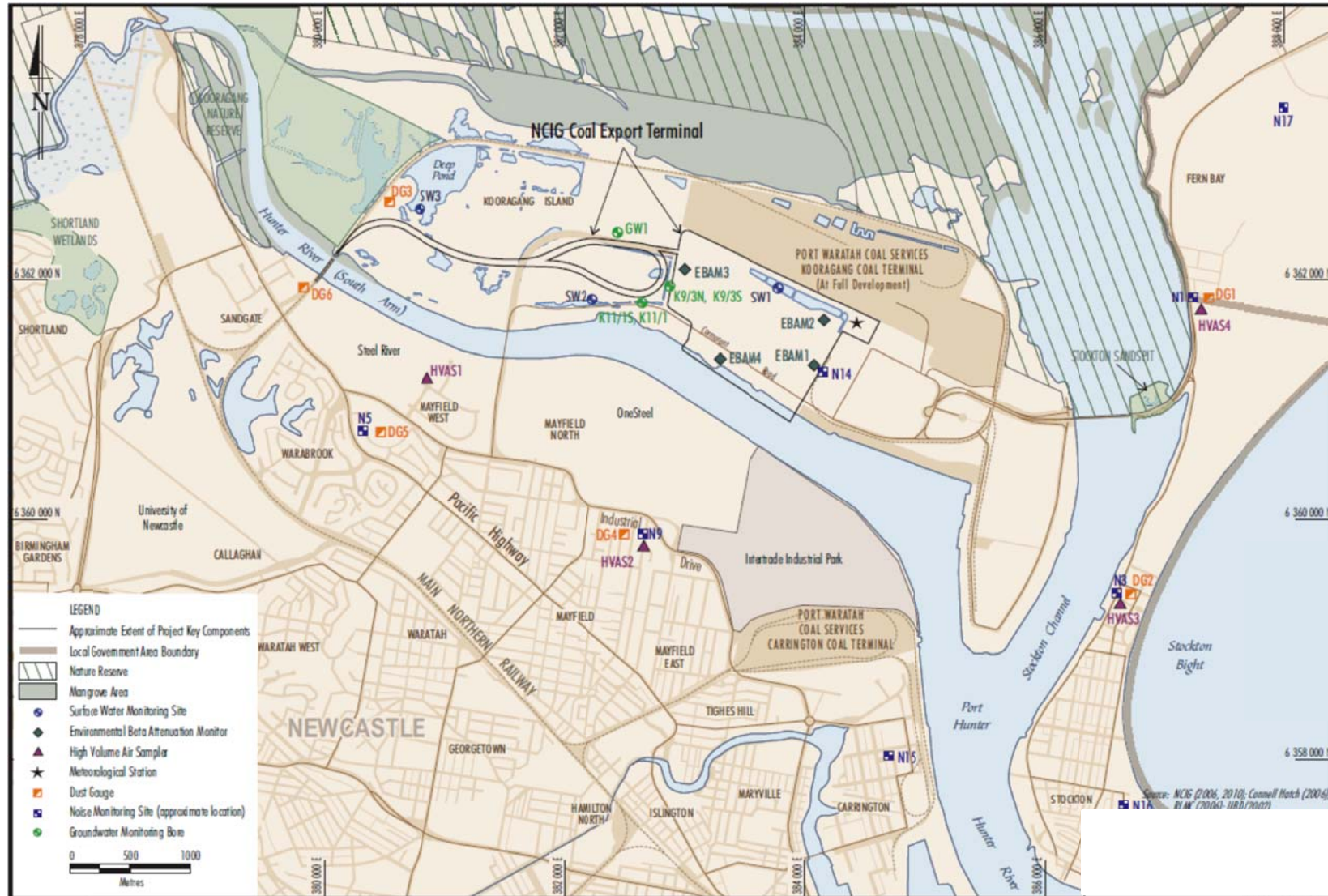
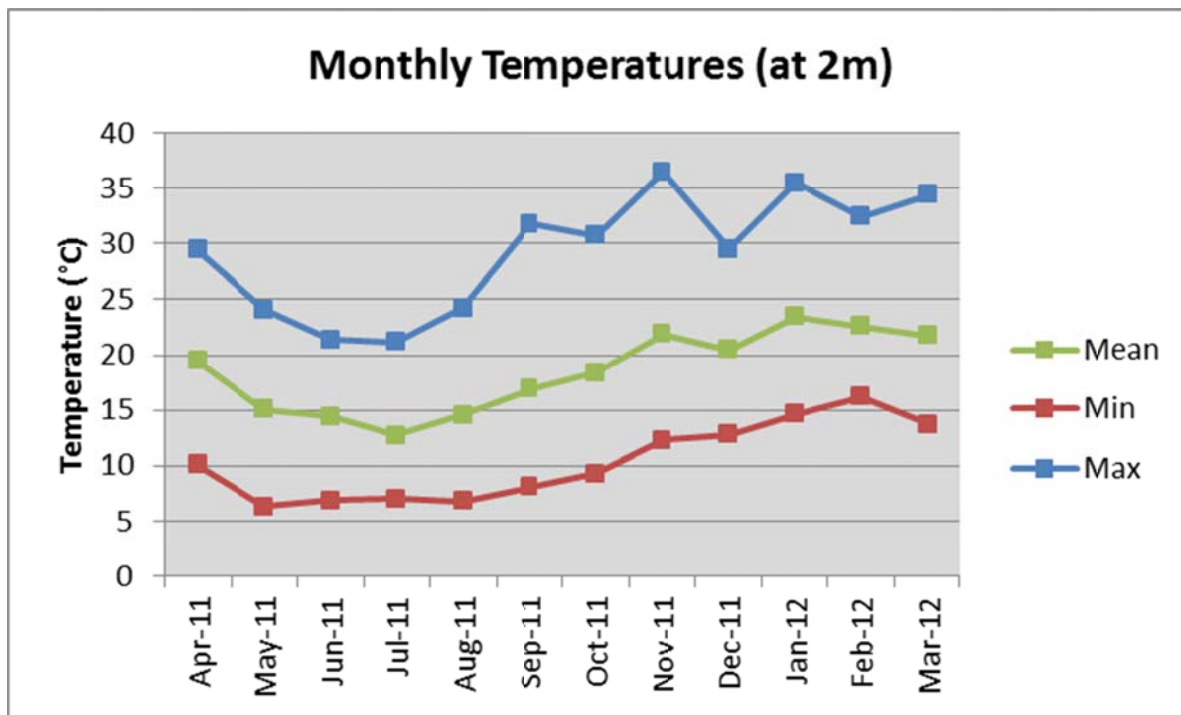


Figure 3.1.1: Environmental Monitoring Site

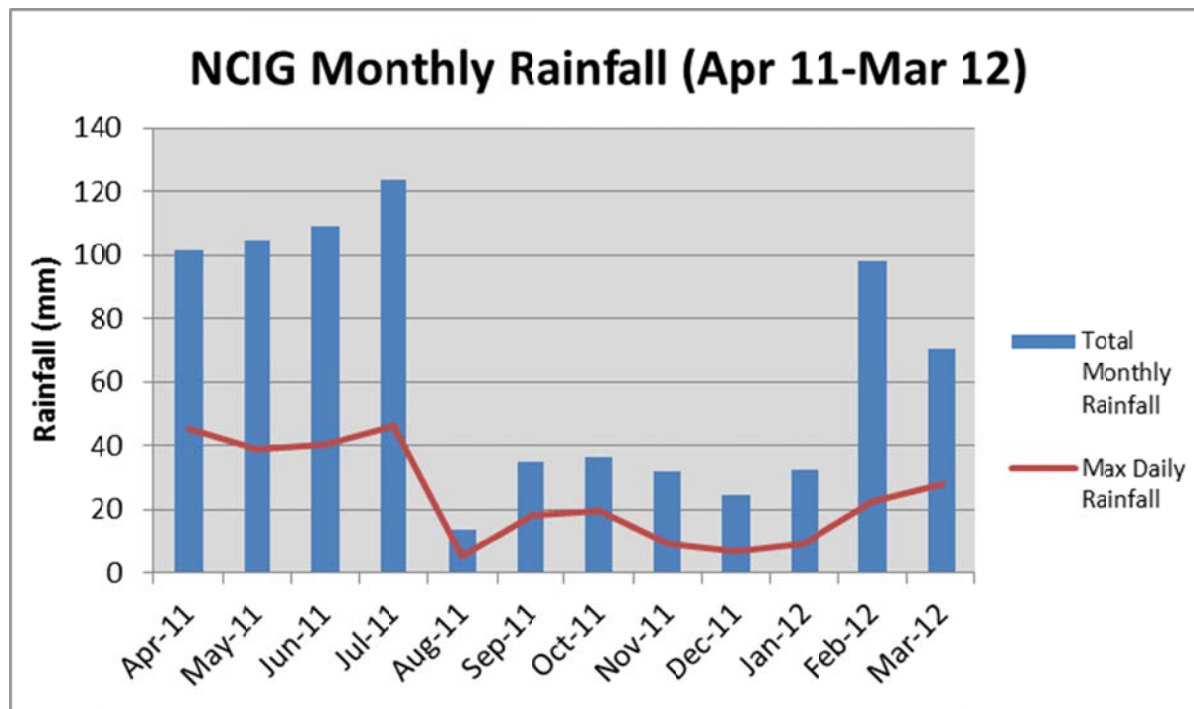
**Table 3.1.2: Meteorological Monitoring Information**

	Rainfall					Wind Speed					Sigma Theta			
	Mean	SD	Min	Max		Mean	SD	Min	Max		Mean	SD	Min	Max
<b>Apr-11</b>	0.02	0.21	0	8.6	<b>Apr-11</b>	2.99	1.88	0	15.7	<b>Apr-11</b>	18.17	12.20	2.8	103.1
<b>May-11</b>	0.02	0.14	0	2.6	<b>May-11</b>	3.54	2.35	0	17.6	<b>May-11</b>	14.38	12.00	0.8	97.8
<b>Jun-11</b>	0.03	0.17	0	3.0	<b>Jun-11</b>	4.92	2.87	0	18.2	<b>Jun-11</b>	11.21	8.90	1.6	94.2
<b>Jul-11</b>	0.03	0.17	0	4.2	<b>Jul-11</b>	5.04	3.38	0	19.0	<b>Jul-11</b>	11.89	10.01	1.5	89.3
<b>Aug-11</b>	0.00	0.05	0	1.2	<b>Aug-11</b>	2.95	2.08	0	11.8	<b>Aug-11</b>	19.31	17.47	2	100.7
<b>Sep-11</b>	0.01	0.06	0	1.2	<b>Sep-11</b>	3.71	2.76	0	17.7	<b>Sep-11</b>	18.27	16.23	1.9	98.5
<b>Oct-11</b>	0.01	0.08	0	2.6	<b>Oct-11</b>	2.98	1.91	0	11.6	<b>Oct-11</b>	19.22	14.05	1.6	101.0
<b>Nov-11</b>	0.01	0.57	0	2.4	<b>Nov-11</b>	3.14	2.10	0	14.6	<b>Nov-11</b>	19.59	14.24	0.7	98.7
<b>Dec-11</b>	0.01	0.05	0	1.2	<b>Dec-11</b>	3.29	2.00	0	13.1	<b>Dec-11</b>	17.29	9.75	1.6	101.2
<b>Jan-12</b>	0.01	0.12	0	7.6	<b>Jan-12</b>	3.52	2.13	0	13.3	<b>Jan-12</b>	16.33	12.28	2.8	101.7
<b>Feb-12</b>	0.02	0.30	0	16.6	<b>Feb-12</b>	2.81	1.90	0	10.8	<b>Feb-12</b>	20.33	14.18	5.2	100.5
<b>Mar-12</b>	0.02	0.15	0	4.4	<b>Mar-12</b>	3.06	2.01	0	13.8	<b>Mar-12</b>	18.29	12.75	3.5	99.6
	Temperature @ 2m					Temperature @10m					Solar Radiation			
	Mean	SD	Min	Max		Mean	SD	Min	Max		Mean	SD	Min	Max
<b>Apr-11</b>	19.47	2.85	10.1	29.4	<b>Apr-11</b>	18.84	2.73	9.9	28.6	<b>Apr-11</b>	127.65	196.30	2	826
<b>May-11</b>	15.05	3.37	6.3	24.1	<b>May-11</b>	14.51	3.39	5.8	23.5	<b>May-11</b>	99.33	153.68	3	732
<b>Jun-11</b>	14.38	3.45	6.9	21.4	<b>Jun-11</b>	13.89	3.47	6.1	20.5	<b>Jun-11</b>	88.14	134.28	4	567
<b>Jul-11</b>	12.71	2.62	7	21.2	<b>Jul-11</b>	12.27	2.68	6.1	20.9	<b>Jul-11</b>	92.45	142.23	5	622
<b>Aug-11</b>	14.56	3.34	6.8	24.2	<b>Aug-11</b>	14.04	3.36	6.0	23.7	<b>Aug-11</b>	123.23	175.55	5	856
<b>Sep-11</b>	16.92	3.86	8.1	31.8	<b>Sep-11</b>	16.39	3.86	6.9	31.6	<b>Sep-11</b>	164.85	235.74	3	868
<b>Oct-11</b>	18.37	3.50	9.3	30.7	<b>Oct-11</b>	17.79	3.48	8.9	30.3	<b>Oct-11</b>	180.22	258.23	2	1113
<b>Nov-11</b>	21.91	4.22	12.3	36.5	<b>Nov-11</b>	21.38	4.19	12.1	35.9	<b>Nov-11</b>	205.03	277.34	0	1103
<b>Dec-11</b>	20.49	2.55	12.8	29.5	<b>Dec-11</b>	19.88	2.49	12.0	28.3	<b>Dec-11</b>	203.63	290.75	1	1234
<b>Jan-12</b>	23.45	2.70	14.6	35.5	<b>Jan-12</b>	22.81	2.65	13.6	34.4	<b>Jan-12</b>	213.25	297.26	1	1214
<b>Feb-12</b>	22.63	2.51	16.2	32.4	<b>Feb-12</b>	22.03	2.47	15.5	31.8	<b>Feb-12</b>	188.83	276.88	2	1109
<b>Mar-12</b>	21.78	2.79	13.7	34.4	<b>Mar-12</b>	21.20	2.79	12.9	33.8	<b>Mar-12</b>	160.48	238.77	2	1067



**Figure 3.1.2: Average Temperature**

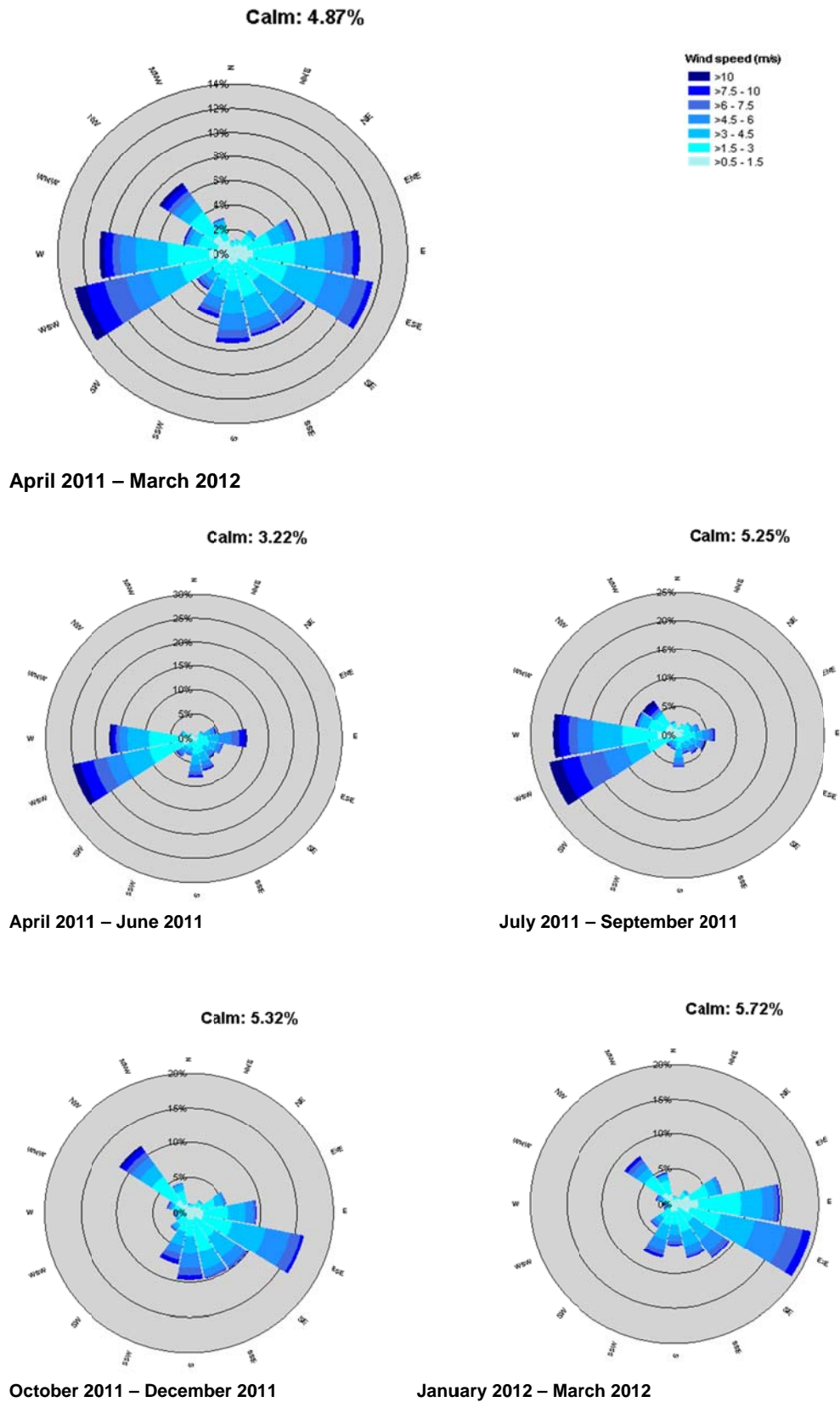
The monthly and daily rainfall recorded at the project site is illustrated by Figure 3.1.3. A total of 781mm of rain was received on the site during the reporting period with the highest rainfall event recorded in July 2011. Low rainfall was received during the August 2011 to January 2012 period.



**Figure 3.1.3: Daily and Average Rainfall**

Figure 3.1.4 also illustrates the seasonal variation in wind speed and direction at the site which highlights that the dominant conditions in relation to wind has a westerly aspect during the autumn,

winter and spring periods and has a predominately easterly aspect with some westerlies during the summer period.



**Figure 3.1.4: Seasonal Wind Conditions**

### 3.1.3 Reportable Incidents

No environmental incidents or complaints relating to meteorological conditions were made during the reporting period.

### 3.1.4 Further Improvements

The automated meteorological monitoring station was incorporated into the site management system of NCIG operational activities in 2011/12. During this period, parameters such as wind direction were used in the control of stockyard sprays. This included deactivation of sprays under wind conditions where sprays would otherwise be ineffective in reaching coal stockpiles. Further improvements will be made involving the meteorological monitoring station, including using wind direction and wind speed to activate stockyard sprays under extreme weather events. Similarly, rainfall will be used to deactivate sprays during wet conditions.

Monitoring of compliance with the relevant meteorological monitoring conditions and standards occurs as part of ongoing maintenance.

## 3.2 AIR QUALITY

### 3.2.1 Environmental Management

In accordance with Conditions 2.2 and 2.4, Schedule 2 of the Project Approval (06\_0009) NCIG designed and constructed the Project in a manner that minimises or prevents the emission of visible dust beyond the boundary of the site (including windblown and traffic generated dust).

In accordance with Condition 2.5, Schedule 2 of the Project Approval (06\_0009) dust emissions are being controlled on all internal roads, trafficable areas and manoeuvring areas by sealing, or otherwise treating surfaces to minimise the potential for dust generation.

In accordance with Condition 2.1, Schedule 2 of the Project Approval (06\_0009) NCIG did not permit any offensive odour, as defined under section 129 of the *Protection of the Environment Operations Act, 1997*, to be emitted beyond the boundary of the Project site.

### 3.2.2 Environmental Performance

Table 3.2.1 outlines the monitoring locations, air quality parameters recorded, frequency of monitoring and air quality criteria for the Project in accordance with the CEMP.

**Table 3.2.1: Summary of the Meteorological Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Dust deposition <sup>2</sup> .	DG1, DG2, DG3, DG4, DG5 and DG6 <sup>1</sup> .	Monthly during the first three months of construction, then quarterly.	4 g/m <sup>2</sup> /month.
Total Suspended Particulates (TSP).	HVAS1, HVAS2, HVAS3, HVAS4.	6-daily.	90µg/m <sup>3</sup> (NHMRC annual average)

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Particulate Matter <10 microns (PM <sub>10</sub> ).	HVAS1, HVAS2, HVAS3, HVAS4.	6-daily.	50µg/m <sup>3</sup> (OEH 24hr daily limit, NEPM 24hr daily limit – allows for 5 exceedences in a year)

- 1 The location of monitoring sites is shown on Figure 3.1.1.
- 2 Dust deposition was analysed in accordance with AS/NZS 3580.10.1-2003 *Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method*.
- 3 TSP was analysed in accordance with AS/NZS 3580.9.3-2003 *Methods for Sampling and Analysis of Ambient Air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – high volume sampler gravimetric method*.
- 4 PM10 was analysed in accordance with AS/NZS 3580.9.6-2003 *Methods for Sampling and Analysis of Ambient Air – Determination of suspended particulate matter – PM10 high volume sampler with size selective inlet – Gravimetric method*.

The depositional dust monitoring results for the reporting period are displayed in Figures 3.2.1 and 3.2.2 below.

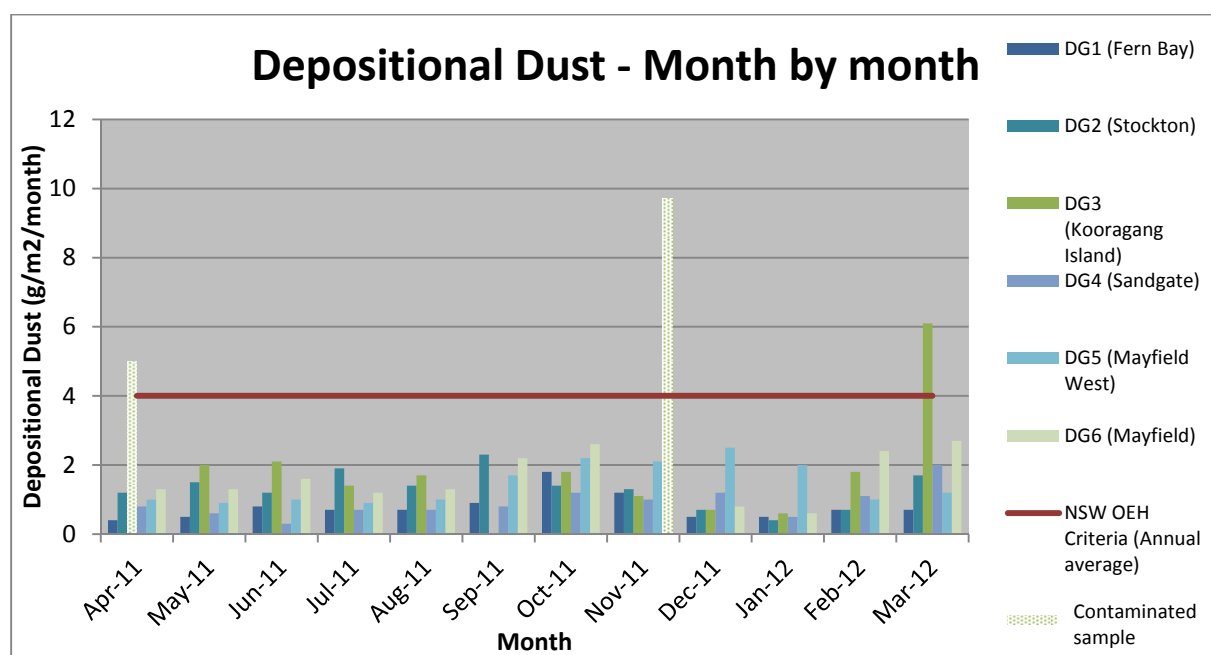
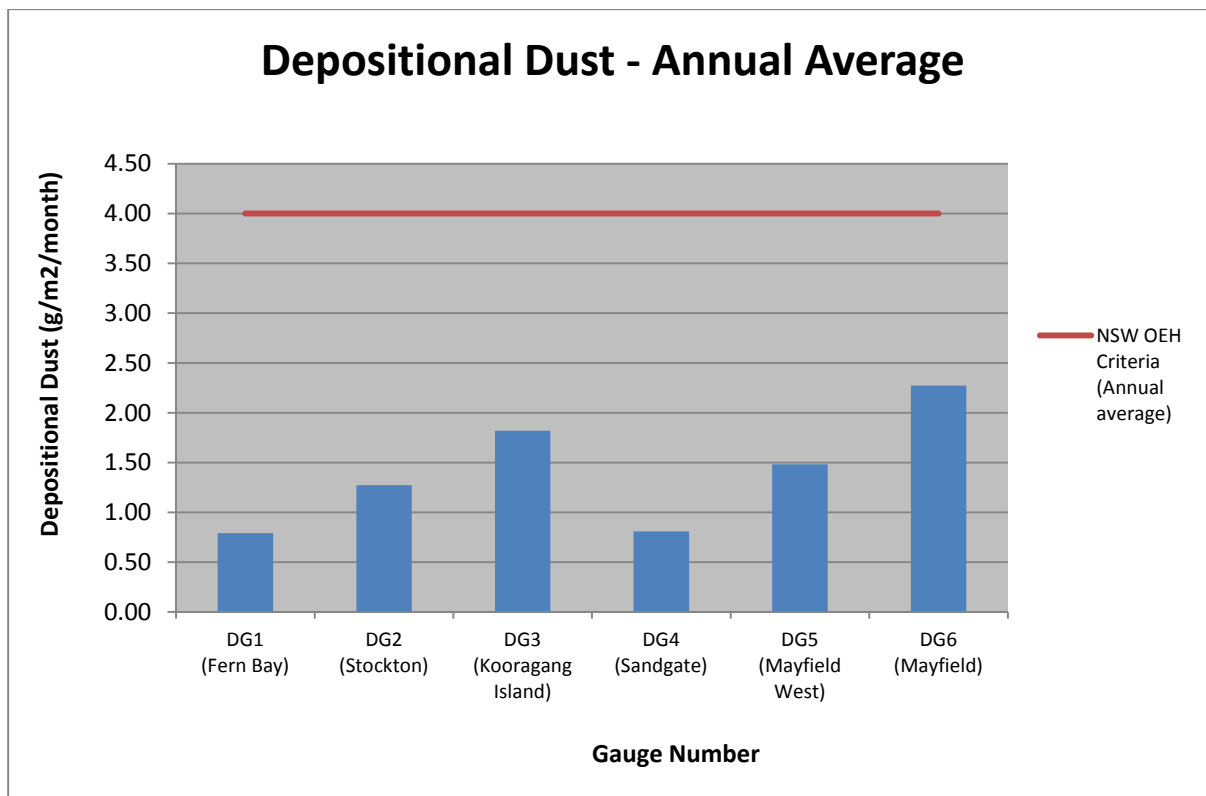


Figure 3.2.1: Month by Month Depositional Dust



**Figure 3.2.2: Annual Average Depositional Dust**

Average depositional dust results were below the monthly criteria of 4 grams per square metre per month at all depositional dust gauge locations (Figure 3.2.2). Figure 3.2.1 shows that DG3 exceeded the 4g/m<sup>2</sup>/month criteria in April 2011 (4.2) and March 2012 (6.1), however this was caused by contaminated samples. DG6 also exceeded the criteria in November (9.7), which was caused by contamination. All other dust gauges were consistently below the criteria. It should be noted that the criteria is specific only to an annual average for each location. Figure 3.2.2 illustrates that the annual average at each location was below 4g/m<sup>2</sup>/month during the reporting period. Full dust deposition data for the reporting period is provided in Attachment A.

Air quality monitoring results from High Volume Air Sampling (HVAS), as they relate to both Total Suspended Particulate (TSP) and Particulate Matter less than 10 Microns (PM<sub>10</sub>), are displayed in Figures 3.2.3 and 3.2.4.

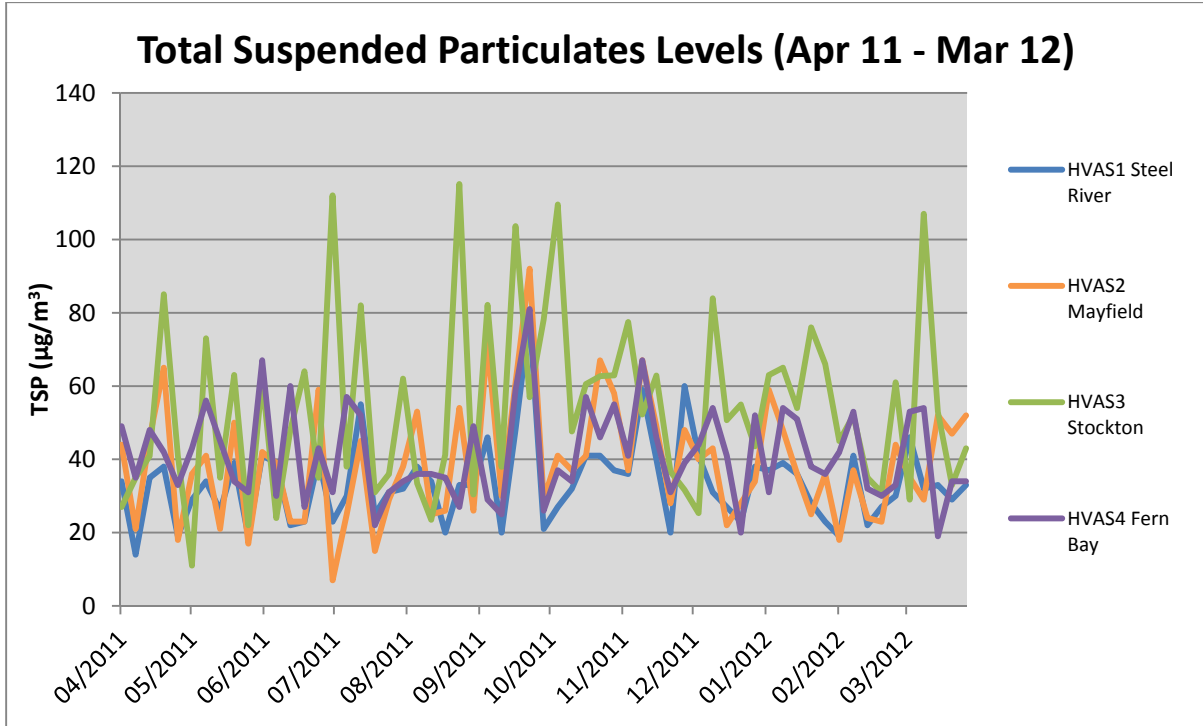


Figure 3.2.3: Total Suspended Particulates (TSP)

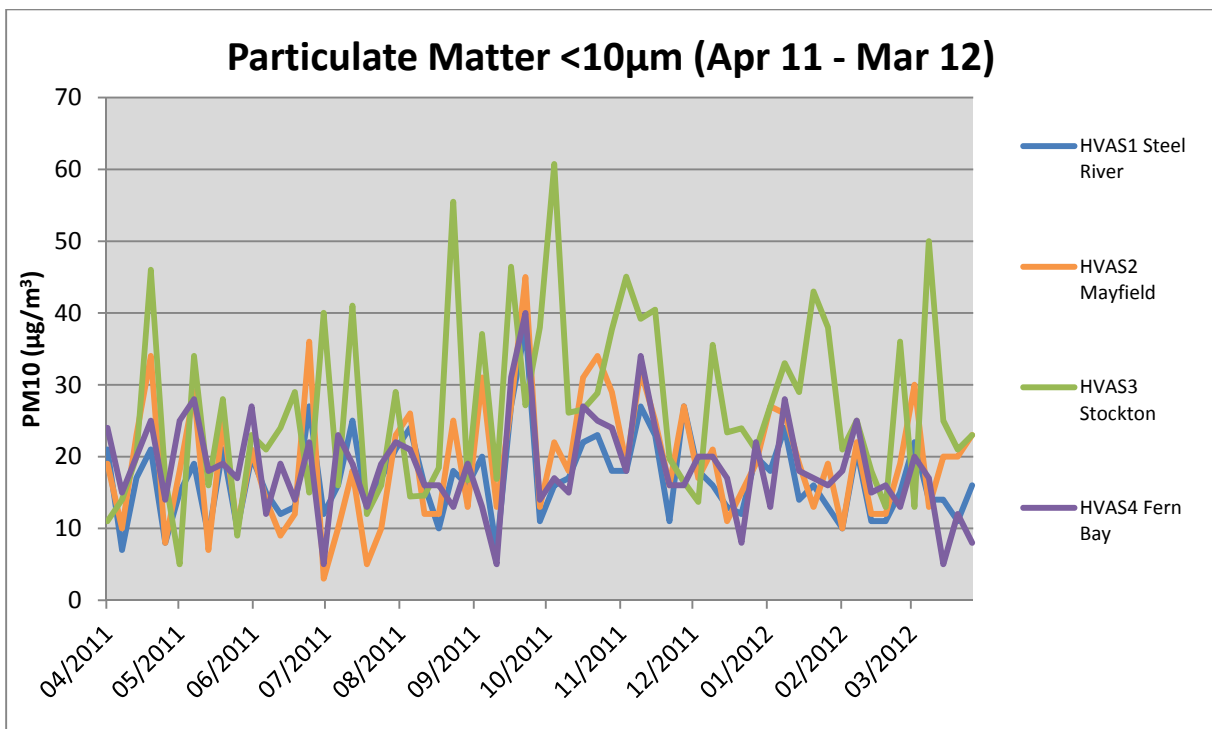


Figure 3.2.4: Particulate Matter <10 $\mu\text{m}$  (PM10)

The annual average TSP concentrations for all four monitoring locations were below the NHMRC Annual Average Limit of  $90\mu\text{g}/\text{m}^3$ , as shown in Table 3.2.2. Daily concentrations of  $\text{PM}_{10}$  were also below their respective guideline of  $50\mu\text{g}/\text{m}^3$  (OEH and NEPM), with the exception of three individual dates; 24 August 2011, 5 October 2011 and 9 March 2012 (all Stockton). Meteorological conditions

were reviewed on these days to assess the likelihood that NCIG had contributed to these elevated levels:

- 24 August 2011 – 24hr PM<sub>10</sub> level was 55µg/m<sup>3</sup>. Wind direction was from the west and east. Wind speed was below 3.3 m/s when blowing from the west and predominantly below 2 m/s. Onsite dust suppression, including stockyard sprays were fully functional and onsite PM<sub>10</sub> monitoring indicated there were no elevated levels during the period of high winds. This suggests that NCIG did not contribute to high PM<sub>10</sub> levels in Stockton.
- 5 October 2011 – 24hr PM<sub>10</sub> level was 61µg/m<sup>3</sup>. Wind direction was from the northwest and east/southeast. Wind speed was below 3.7 m/s when blowing from the northwest and predominantly below 2.5 m/s. Onsite dust suppression, including stockyard sprays were fully functional and onsite PM<sub>10</sub> monitoring indicated there were no elevated levels during the period of high winds. This suggests that NCIG did not contribute to high PM<sub>10</sub> levels in Stockton.
- 9 March 2012 – 24hr PM<sub>10</sub> level was 50µg/m<sup>3</sup>. Wind direction predominantly from the west/northwest. Wind speed reached 8.7 m/s and was above 5 m/s for an extended period. Onsite dust suppression, including stockyard sprays were fully functional and onsite PM<sub>10</sub> monitoring indicated there were no elevated levels during the period of high winds. Despite high risk wind conditions, onsite dust monitoring suggests that NCIG did not contribute to high PM<sub>10</sub> levels in Stockton.

The OEH Annual Average Goal of 90µg/m<sup>3</sup> for TSP and 30µg/m<sup>3</sup> for PM<sub>10</sub> was not exceeded, as shown in Table 3.2.2 below.

**Table 3.2.2: Annual Average TSP and PM10 Concentrations**

	Limit	HVAS1	HVAS2	HVAS3	HVAS4
Annual Average TSP Concentration (Apr 11 – Mar 12)	90	33.57	38.97	54.19	41.49
Annual Average PM <sub>10</sub> Concentration (Apr 11 – Mar 12)	30	17.00	19.38	26.63	18.56

As a result of a dust event on 10 July 2011 (see section 3.2.3), NCIG were requested by OEH to operate a High Volume Air Sampler (HVAS) for the entire September 2011 period. TSP filter papers were collected from the HVAS daily which provided a daily average reading. NCIG were also requested by the OEH to conduct further analyses on selected filter papers from days with adverse wind conditions. Analyses include particle size distribution and coal particle content.

TSP results ranged from 125-505µg/m<sup>3</sup> under adverse NW-wind weather conditions, with coal percentage ranging from 10-50%. This was translated to coal dust concentrations ranging from 50-86µg/m<sup>3</sup>. TSP concentrations were likely associated with dust sources other than coal, e.g. unsealed roads, Kooragang Island-wide construction activities. Under milder weather conditions with wind from the Southeast, TSP concentrations ranged from 105-135µg/m<sup>3</sup>. Coal percentage ranged from 40-55% and coal dust concentrations were interpreted as ranging from 42-74µg/m<sup>3</sup>. Coal dust concentrations under mild conditions from the Southeast were comparable with those under adverse wind conditions from the Northwest indicating that the presence of coal dust on the site was not unduly impacted by wind parameters. The levels of coal dust measured were deemed acceptable as the monitoring location was on the NCIG site and within 50m of an active coal stockpile. These results were communicated with OEH, with no further action or investigation requested.

Dust from coal handling operations was managed primarily through suitable design of plant and machinery, including appropriate enclosing of areas at the dump station, conveyors, the buffer bin and feeders throughout the site. Additional measures include operation of dust suppression and moisture addition sprays at transfer points positioned both in transfer houses and on the machines (i.e. Stacker/Reclaimers and the Shiploader). Dust suppression spray guns have also been positioned along the stockyard berms directly adjacent the coal stockpiles. These operate on an automatic sequence, which takes into account varying weather conditions and evaporation rates of water from stockpiles. The onsite weather station is also connected to the system. This system is managed in accordance with the Operations Dust Management Plan (ODMP).

In accordance with Condition 3.2 e) of Project Approval (06\_0009), NCIG utilises real-time monitoring data to inform environmental management decisions associated with the project. This is done through interaction with real-time Environmental Beta Attenuation Monitors (EBAMs), which measure PM<sub>10</sub>. These are located at the boundaries of the stockyard and are used to assist the management of operation to ensure compliance with project obligations.

The dust control measures implemented during construction of the Project include the following:

- demarcation and minimisation of ground disturbance areas;
- paving of appropriate internal roads;
- watering of exposed ground disturbance areas and high traffic areas using water trucks to minimise the generation of dust;
- establishment of grass pasture on disturbed areas as soon as possible;
- confining vehicle movements to designated access routes;
- limiting the speed of vehicles on unpaved roads; and
- limiting ground disturbance activities during identified windy conditions.

All stockpiled construction materials were also managed to minimise wind-blown dispersal of the materials in accordance with Condition 2.45 of Project Approval (06\_0009) by limiting the height of the stockpiles and watering of the stockpiles during windy conditions.

### **3.2.3 Reportable Incidents**

One air quality incident was reported during the reporting period, on 10 July 2011. This was a dust event involving exceptionally strong winds in excess of 15 m/s. An enquiry was lodged by the Office of Environment and Heritage (now EPA) after complaints had been received on the Environment Line from observers on Cormorant Road. A monitoring period was requested by OEH (detailed in section 3.2.2). As a result of the incident changes were made to the automated stockyard sprays to ensure that stockpiles were being adequately sprayed prior to predicted adverse wind conditions.

Complaints regarding air quality received during the reporting period (see Section 3.13) were responded to in accordance with the Complaints Response Procedure.

### **3.2.4 Further Improvements**

Further enhancement of NCIG's Dust Management System will be made in the following reporting period. This may include minor adjustments to moisture addition (may include an increase or reduction) both in the stockyard and on conveyors based on updated dust and moisture results.

### 3.3 WATER QUALITY

#### 3.3.1 Environmental Management

In accordance with Condition 7.6 c), Schedule 2 of the Project Approval (06\_0009), an Operations Water Management Plan (OWMP) was developed which defines the surface water, stormwater and groundwater controls on the NCIG Project site during operation. The Plan includes specific measures designed to avoid sediment-laden, coal-laden or hydrocarbon-impacted surface water from entering Deep Pond, wetland areas or the Hunter River. The Plan also includes a monitoring programme of surface water utilised on and around the Site. The plan identifies water management infrastructure and water requirements for activities such as dust suppression and plant washdown. A site water balance is included, which accounts for water captured on site through rainfall and volumes of water that may be required from the local potable water system.

In accordance with Condition 7.3b), Schedule 2 of Project Approval (06\_0009), a Construction Surface Water Management Plan (CSWMP) was developed which defines how surface water and stormwater is managed on the NCIG CET site during construction. The Plan includes the definition of appropriately-sized stormwater controls, in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). The Plan also includes specific measures designed to avoid sediment-laden stormwater from entering Deep Pond, wetland areas or the Hunter River, and a monitoring programme for stormwater leaving the Site.

The CSWMP and OWMP identify that surface water runoff from disturbance areas during construction and operation of the Project could potentially contain sediments, soluble salts, fuels, oils, grease and other contaminants, in particular coal residue. The potential surface water quality impacts that relate to these contaminants from each area of the Project site are summarised in Table 3.3.1.

This identification of surface water flows was utilised to develop the monitoring programme defined in both the CSWMP and the OWMP which aim to ensure adjacent waterbodies are not impacted by NCIG construction activities. The CSWMP and OWMP were approved by the Department of Planning (now NSW Planning and Infrastructure) as part of the Construction Environmental Management Plan (CEMP) and Operations Environmental Management Plan (OEMP) respectively.

The surface water management strategies, as detailed in both the CSWMP and OEMP, are:

- the separation of surface water runoff generated from within the active CET and Project construction areas from that generated from surrounding areas;
- containment and reuse of water onsite;
- the implementation of adequate water management controls to minimise the potential for impacts to off-site water resources such as adjacent wetland areas, Deep Pond and the Hunter River (Figure 3).

**Table 3.3.1: Potential Surface Water Quality Impacts**

Project Site	Potential Impact Scenario	Potential Contaminant
Rail Infrastructure Corridor	Uncontrolled drainage of sediment laden runoff to downstream waterbodies within the Kooragang Island Waste Emplacement Facility (KIWEF) during construction of rail embankments.	Sediments, soluble salts, heavy metals, organic contaminants, fuels, oils and grease.
	Uncontrolled drainage of runoff from access roads and construction areas to downstream waterbodies within the KIWEF.	
	Uncontrolled drainage of runoff from exposed soils within the existing KIWEF to downstream waterbodies.	
	Potential erosion and sedimentation resulting from runoff from the rail corridor and associated drainage system.	
	Release/spill into downstream waterbodies.	Coal, diesel, lubricants and hydrocarbons.
Coal Storage Area	Uncontrolled drainage to downstream waterbodies during construction of the coal storage area.	Sediments, soluble salts, heavy metals, organic contaminants, fuels, oils, lubricants and low pH water.
	Uncontrolled drainage of runoff from access roads and construction areas to downstream waterbodies.	
	Spillage/overflow of site water to downstream waterbodies.	
	Release/spill into downstream waterbodies due to rupture of fuel tank (diesel/petrol).	Sediments, coal, diesel, lubricants and hydrocarbons.
Wharf Facilities and Shiploader Area	Uncontrolled drainage of sediment laden runoff to the south arm of the Hunter River during construction of the berths and wharf structure, excavation on or near the banks of the South Arm of the Hunter River and during piling operations.	Sediments, soluble salts, fuels, oils and grease.
	Uncontrolled drainage of runoff to the south arm of the Hunter River from access roads and wharf construction areas including excavation on or near the banks of the South Arm of the of the Hunter River.	
	Release/spill into South Arm of the Hunter River.	Sediments, coal, diesel, lubricants, hydrocarbons.

A separate Soil and Water Management Plan was developed for dredging activities in accordance with Condition B4.5(b), Sub-Schedule B, Schedule 2, of the Port Consent. The Soil and Water Management Plan outlines the measures employed to manage surface water and to minimise soil erosion and the discharge of sediments and other pollutants to lands and/or waters for the duration of dredging and excavation works conducted as part of the extension of shipping channels in the Port of Newcastle. While the results for monitoring requirements under the Soil and Water Management Plan are not included in this report, the general aim of protecting water quality in the South Arm of the Hunter River was maintained. It should be noted that dredged material was dumped at sea and was not brought to land for reclamation works during the reporting period.

The management of erosion and sedimentation is outlined in Section 3.4

### 3.3.2 Environmental Performance

Table 3.3.2 outlines the monitoring locations, frequency of monitoring and monitoring parameters for the Project in accordance with the CEMP and OEMP. These monitoring elements form the Surface Water Monitoring Programme for the Project.

**Table 3.3.2: Surface Water Monitoring Program**

Monitoring Locations	Frequency	Parameters
Primary and secondary settling ponds, overflow pond.	Monthly.	<ul style="list-style-type: none"> <li>pH;</li> <li>Electrical conductivity (EC);</li> <li>Turbidity;</li> <li>Temperature.</li> </ul>
	During period of heavy rainfall (i.e. more than 20 mm of rainfall in a 24 hour period).	<ul style="list-style-type: none"> <li>Water level.</li> </ul>
Surface water monitoring sites. <sup>1</sup>	Monthly.	<ul style="list-style-type: none"> <li>pH;</li> <li>EC;</li> <li>Turbidity;</li> <li>Temperature.</li> </ul>
Drainage, erosion and sediment control infrastructure.	Monthly.	<ul style="list-style-type: none"> <li>Structural stability and effectiveness in controlling sediment migration.</li> </ul>
Collection sumps	Weekly	<ul style="list-style-type: none"> <li>Level of collected sediment.</li> </ul>

Monitoring locations are shown on Figure 3.1.1 and 3.3.2.

A site drainage network was established to capture site runoff. The topography grades to the north and west of the Project site and the existing flow path for surface runoff was incorporated into the completed site surface profile.

The drainage network that was established for dredging activities was incorporated into the design of the permanent water management infrastructure on the site. This design involves stormwater draining from east to west in the coal stockpile area at which point it collects in an open drain and is directed to the north-west of the site (see Figure 3.3.1). Additional subsurface drainage was constructed as part of Stage 2AA, specifically beneath the extended stockpile area. Surface water captured in the construction area of the stockyard is redirected both to the east and west. Both operations and construction surface water is then captured in primary settling ponds across the north of the site where fines are allowed to settle. This water cascades from the primary ponds into a secondary settlement pond prior to collection in the clearwater pond where it is then pumped to water storage tanks and is then available for reuse on the site. This water resource is to be utilised primarily for dust suppression purposes across the site, but also washdown and belt cleaning activities.

Within the design of the drainage network, stormwater from the wharf and rail areas of the site are also directed into the stockyard water management system. Stormwater collected on the wharf is accumulated in an on-site pond and then pumped across Cormorant Road. Stormwater captured in the vicinity of the train unloading station is also pumped to the stockyard, with both sources eventually made available for reuse after treatment in the northern settlement ponds. This includes additional controls constructed as part of Dump Station 2. The existing surface water management controls in the rail loop and sidings allowed for the increased catchment capacity from Stage 2AA rail construction.

Sampling of surface water ponds was also undertaken during the reporting period in accordance with the CSWMP and OWMP. The location of the sampling undertaken is illustrated in Figure 3.3.1 with the water quality results recorded detailed in Attachment B. These results show that some water quality parameters on site (Pond 2) were comparable with offsite water resources while others were variable. Values for pH on site were relatively stable and within a healthy range throughout the year (8.0-8.6), while offsite resources were more variable (7.2-9.2), although this is also considered to be a healthy range and within the historical range. Electrical conductivity (EC) was consistently higher onsite than offsite, and saw a downward trend across all sites for the monitoring period. Elevated onsite EC is

likely due to runoff and infiltration from reclaimed river sediments used for construction of the stockpads. Dissolved Oxygen (DO), while being seasonally variable, was comparable between sites. Turbidity values were variable across all sites, which is likely due to discrete weather events (i.e. rainfall) and the settlement process within onsite ponds.

### **3.3.3 Reportable Incidents**

No environmental incidents or complaints were reported relating to water quality management were made during the reporting period.

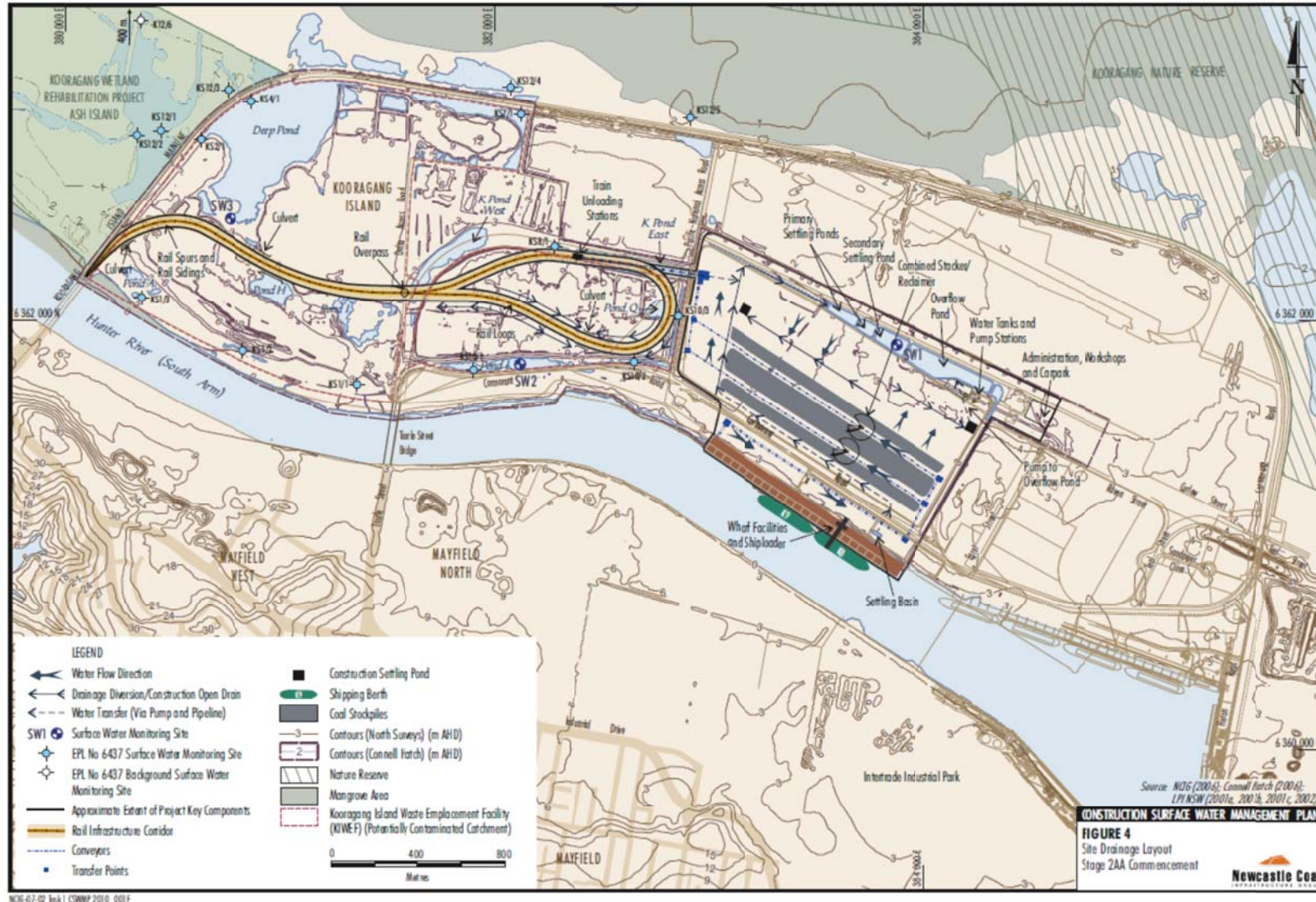


Figure 3.3.1: Permanent Site Drainage Layout



**Figure 3.3.2: Construction of Subsurface Drainage under Stockpile Pad 3**

### **3.3.4 Further Improvements**

Further additions to the surface water management system will be made in the coming period, including Stage 2F construction. This will include subsurface drainage from beneath Coal Stockpile Pads 4 and 5, and associated collection sumps. Surface water drainage controls will also be constructed at K10 wharf and the extension of the portside facility.

## **3.4 EROSION AND SEDIMENT CONTROL**

### **3.4.1 Environmental Management**

In accordance with Condition 2.43, Schedule 2 of the Project Approval (06\_0009) NCIG took all reasonable measures to prevent soil erosion and the discharge of sediments and pollutants from the site during construction activities.

In accordance with Condition 2.42, Schedule 2 of the Project Approval (06\_0009) NCIG has designed and constructed surface water and stormwater management infrastructure on the site to accommodate a 1 in 100 annual recurrence interval (ARI) rainfall event.

All erosion, sediment and pollution control infrastructure is being maintained on the Project site at or above design capacity during construction of the Project and will continue to be until such time as all ground disturbed by the works has been stabilised and rehabilitated so that it no longer acts as a source of sediment, in accordance with Condition 2.44, Schedule 2 of Project Approval (06\_0009).

All stockpiled construction materials have been managed to minimise erosion or dispersal of the materials in accordance with Condition 2.45 of Project Approval (06\_0009). All fill/preload material

brought to the Project site is managed in a manner that minimises erosion and dispersal of those materials to the downstream waters (e.g. south arm of the Hunter River).

In accordance with Condition 2.49, Schedule 2 of the Project Approval (06\_0009), all stormwater and surface water management infrastructure associated with the operation of the Project is lined with a low-permeability material to minimise potential leakage. Stormwater is reused onsite for beneficial purposes such as the wetting of coal to reduce dust emissions from the Site.

All grey wastewaters from the site are directed to sewer in accordance with a Trade Waste Licence, approved through Hunter Water Corporation, in accordance with Condition 2.51, Schedule 2 of Project Approval (06\_0009).

Erosion and sediment control measures and general surface water management measures for the Project are documented in the approved Construction Surface Water Management Plan (CSWMP) and the Operations Water Management Plan (OWMP).

### 3.4.2 Environmental Performance

Table 3.4.1 outlines the monitoring locations, erosion and sediment control parameters recorded, frequency of monitoring and air quality criteria for the Project in accordance with the CEMP.

**Table 3.4.1: Summary of the Erosion and Sediment Control Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Structural stability and effectiveness in controlling sediment migration.	Drainage, erosion and sediment control infrastructure.	Monthly and following significant rainfall events (i.e. greater than 20 mm in 24 hours).	N/A.

The management of erosion and sedimentation for the NCIG Project is detailed by the Erosion and Sediment Control Plan (ESCP). The ESCP is a document that is continually modified to account for project areas and activities of identified risk of erosion and sedimentation. Activities that have the potential to cause or increase soil erosion at the Project have been identified and are primarily due to exposure of soils during construction activities.

The general erosion and sediment control principles adopted take into account the general recommendations for site drainage works presented in *Managing Urban Stormwater: Soils and Construction – Volume 1* (Landcom, 2004) which underpin the goal of protecting adjacent wetland areas, Deep Pond and the Hunter River. These principles involve:

- Minimising surface disturbance and restricting access to undisturbed areas.
- Separation of runoff from disturbed and undisturbed areas where practicable.
- Construction of surface drains to facilitate the efficient transport of surface runoff or utilisation of existing stormwater systems.
- Construction of the site drainage network including perimeter bunds, internal bunds, primary settling ponds and hydraulically controlled discharge structures.
- Construction of primary and secondary settling ponds, site water pond and sediment dams to contain runoff up to specified design criterion.
- Installation of a silt curtain in the south arm of the Hunter River local to the disturbance area during construction of the shipping berth batters, wharf structure and during piling operations (in the River) that may create excessive material disturbance.

In ensuring the erosion and sediment control principles are adhered to, development activities on the Project have been typically undertaken in the following order:

1. Construction of sediment fences (down slope of disturbance areas) where required.
2. Installation of silt curtains in identified water bodies, including the Hunter River, where required.
3. General construction works are only commenced once erosion and sediment control measures are in place.
4. Construction of drainage diversions (typically upslope of disturbance areas) – these were only constructed where they significantly reduced the runoff catchment of disturbance areas and connected to the site drainage network where practicable.
5. Construction of collection drains (down slope of disturbance areas) where required to convey runoff to the site drainage network (including primary and secondary settling ponds and a site water pond).

Erosion and Sediment Control Plans (ESCP), detailing specific erosion and sediment control measures, are developed in a progressive manner prior to the development of each Project component requiring land disturbance. This is undertaken through a risk assessment process associated with the individual task proposed and are modified as required to ensure that the goal of protecting water bodies from erosion and sedimentation is achieved.

Temporary erosion and sediment controls (e.g. silt fences and sediment control structures) are installed prior to the commencement of construction activities on the Project site. Routine (i.e. monthly) inspections of sediment control structures, as well as inspections following significant rainfall events (e.g. 20 millimetres (mm) or more in a 24 hour period), are conducted by NCIG personnel. During these inspections, sediment control structures were inspected for capacity, structural integrity and effectiveness. Any deficiencies identified by these inspections are assessed, prioritised and rectified in the appropriate timeframe.

A network of permanent stormwater structures has been constructed to manage runoff around the site. All long-term site water management structures are lined with low permeability materials (e.g. compacted clay) to minimise the potential for leakage. Water management structures are designed with sufficient capacity for a 1 in 100 year average recurrence interval (ARI) rainfall event.

### **3.4.3 Reportable Incidents**

No environmental incidents or complaints relating to erosion or sediment control were made during the reporting period.

### **3.4.4 Further Improvements**

No scheduled improvement to erosion and sediment control is required for the next period as the construction of the permanent surface water management infrastructure was completed during this reporting period. Ongoing amendments to construction erosion and sediment control will be made as necessary to accommodate the change in work areas.



**Figure 3.4.1: Settling Pond Infrastructure**



**Figure 3.4.2: Concrete-lined drain leading to Concrete-lined Water Management Pond**

### 3.5 GROUNDWATER

#### 3.5.1 Environmental Management

Groundwater monitoring requirements were changed during the monitoring period as specified in EPL 12693. Monitoring Points GW2, GW3 and GW4 were removed from the licence and replaced with K9/3N, K9/3S, K11/1S and K11/1 (as shown in Figure 3.1.1), referred to as Monitoring Points 20, 21, 22 and 23 in the EPL. The reason for this change was to detect potential migration of contaminants of concern which may be mobilised as a result of settlement from the NCIG constructed rail embankments. The source of contamination is the former Kooragang Island Waste Emplacement Facility (KIWEF), which lies beneath the NCIG rail loop. Contaminants of concern include mainly hydrocarbons and some inorganic compounds. A series of Groundwater Trigger Values are established in the EPL, which activate further monitoring at additional location and a notification process if exceeded. Monitoring of GW1 remains a requirement.

#### 3.5.2 Environmental Performance

Table 3.5.1 outlines the monitoring locations, groundwater monitoring parameters recorded, frequency of monitoring and groundwater criteria for the Project in accordance with EPL 12693.

**Table 3.5.1: Summary of the Groundwater Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Al, Ammonia, Benzene, Co, Conductivity, Cu, Cyanide (Free), Cyanide (Total), Ethyl Benzene, Fe, m+p-Xylene, Mg, Mn, Ni, o-Xylene, pH, Phenol, K, Na, Toluene, Total PAH, TPH C6-9, TPH C10-36, Zn.	GW1 (Monitoring Point 1).	6 Monthly.	Refer EPL 12693.
Ammonia, Benzene, Conductivity, Cyanide (Free), Cyanide (Total), Ethyl Benzene, m+p-Xylene, o-Xylene, pH, Phenol, Toluene, Total PAH, TPH C6-9, TPH C10-36.	K9/3S, K9/3N, K11/1S, K11/1 (Monitoring Points 20-23).	6 Monthly.	Refer EPL 12693.
Al, Ammonia, Benzene, Co, Conductivity, Cu, Cyanide (Free), Cyanide (Total), Ethyl Benzene, Fe, m+p-Xylene, Mn, Ni, o-Xylene, pH, Phenol, K, Na, Toluene, Total PAH, TPH C6-9, TPH C10-36, Zn.	K11/3E, K11/3W, K11/2E, K11/2W, K9/4E, K9/4W, K9/2E, K9/2W, K10/4W, DM10 (Monitoring Points 24-33).	Only if Trigger Criteria is exceeded at Monitoring Points 20, 21, 22 or 23 and is confirmed through second monitoring round.	Refer EPL 12693.

<sup>1</sup> The location of monitoring sites is shown on Figure 3.1.1.

The Project site includes a relatively shallow groundwater table in areas of fill from previous landuse activities. Consequently, any interception of the groundwater table during Project construction activities or effect on the groundwater system as a result of Project operations is being managed. NCIG has incorporated into the design of the Project a comprehensive suite of construction methods and design systems. In response to groundwater conditions encountered on the project site the following groundwater management contingency measures were adopted for specific Project elements:

- piled foundations together with diaphragm sub-surface perimeter walls and jet-grouted base for construction of the train unloading stations base and adjacent conveyors were constructed to minimise groundwater inflow or connection (this was constructed in the tunnel beneath Dump Station 2 as part of Stage 2AA during this reporting period);
- a low permeability capping layer was incorporated into the rail embankment formation to minimise infiltration; and
- groundwater bores were established to monitor groundwater levels, and water quality around the perimeter of the coal storage area and along the rail infrastructure corridor.

A summary of the groundwater monitoring results recorded during the reporting period is illustrated in Attachment C.

An assessment of the monitoring records found that the Trigger Values were not exceeded at any of the required monitoring locations. Concentrations at GW1 were also within ranges previously recorded at this location.

Excavations for Dump Station 2 and associated tunnel and conveyor infrastructure were completed during the reporting period. Groundwater encountered during this work was tested prior to dewatering, and was found to be within acceptable levels, with similar concentrations to excavations during Dump Station 1 construction.

### **3.5.3 Reportable Incidents**

No environmental incidents or complaints relating to groundwater quality conditions were made during the reporting period.

### **3.5.4 Further Improvements**

No improvement to groundwater quality monitoring is required for the next period. The current groundwater quality monitoring network will be incorporated into an extended monitoring system prior to the commencement of NCIG operational activities.

## **3.6 LAND CONTAMINATION**

### **3.6.1 Environmental Management**

In accordance with Condition 2.53, Schedule 2 of the Project Approval (06\_0009) NCIG engaged an appropriately qualified person to audit construction of the rail infrastructure over land used as part of the Kooragang Island Waste Emplacement Facility (KIWEF) against the commitments contained in the NCIG Project Environmental Assessment and supporting documents.

Prior to any excavation on the Project, a comprehensive surface and sub-surface soil sampling and analysis programme was undertaken in order to characterise the material to be excavated. The sampling programme was undertaken in accordance with the NSW Environment Protection Authority (EPA) (2004b) *Guidelines for the Assessment, Classification and Management of Liquid and Non-Liquid Waste*. The aim of the programme was to identify the risk associated with contamination across the stockyard and rail areas and to determine the suitability of the site for the development of the NCIG project. The findings of this process were that there existed a manageable risk associated with contamination and that the site was suitable for the proposed development.

In accordance with Condition 2.54, Schedule 2 of the Project Approval (06\_0009) NCIG did not direct any contaminated materials removed from the site to a waste management facility that was not lawfully permitted to accept the materials.

### 3.6.2 Environmental Performance

There were some excavations into the existing ground surface during the construction of the stockyard areas. The construction activities in this area primarily focussed on filling to raise the level of the existing ground therefore there was little disturbance with potentially contaminated soils.

The construction of the train unloading station – Dump Station 2 continued in this reporting period. This work required excavation into existing ground for the preparation of foundations. Ongoing observations and testing of dewatering water indicated no contamination above relevant site criteria. This was in alignment with previous experience during construction of Dump Station 1.

In accordance with the NCIG Environmental Assessment, capping of the rail infrastructure area was completed over 12 months prior to this reporting period. This capping activity was undertaken to ensure that the entire footprint of the NCIG rail infrastructure in the KIWEF area is capped with low permeability material in accordance with the commitments made in the NCIG Environmental Assessment and to DECC (now EPA). Audit reports were produced by an independent auditor and provided to Department of Planning (DoP) and Department of Environment, Climate Change Water (DECCW), verifying that capping was in accordance with the Project Approval and the Environmental Assessment. There were no major excavations into the constructed capping during this monitoring period.

### 3.6.3 Reportable Incidents

No environmental incidents or complaints relating to land contamination were made during the reporting period.

### 3.6.4 Further Improvements

No improvement to land contamination management is required for the next period.

## 3.7 ACID SULFATE SOILS

### 3.7.1 Environmental Management

In accordance with Condition 7.3(a), Schedule 2 of Project Approval (06\_0009), an Acid Sulfate Soil Management Plan (ASSMP) was developed in accordance with the guidance provided in the *Acid Sulfate Soil Manual* (ASSMAC, 1998). This addresses the management of Acid Sulfate Soils (ASS) identified during excavations on the Project site. The ASSMP was approved by the Department of Planning.

### 3.7.2 Environmental Performance

Table 3.7.1 outlines the monitoring locations, ASS monitoring parameters recorded, frequency of monitoring and ASS criteria for the Project in accordance with the ASSMP.

**Table 3.7.1: Summary of the ASS Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Presence of acid sulfate soils or potential acid sulfate soils.	Excavation sites.	Prior to any excavation.	See ASSMP.
	ASS treatment area.	After treatment.	

Soil testing and assessments of the ASS risk was undertaken during excavations and major earthworks in previous reporting periods and it was determined the potential and actual ASS risk associated with these activities was limited. The ASSMP was however prepared to provide sampling, validation and management measures if ASS is encountered during further construction of the Project.

The NSW Acid Sulfate Soil Management Advisory Committee (ASSMAC), *Acid Sulfate Soil Manual* (1998), presents guidelines for the sampling, determination and management of ASS materials dependent on the quantity of material to be disturbed and the type of disturbance (linear, bulk). The guidelines provided in the *Acid Sulfate Soil Manual* (ASSMAC, 1998) are considered appropriate for use at the Project site.

The *Acid Sulfate Soil Manual* (ASSMAC, 1998) outlines 'Action Criteria' based on laboratory analysis of ASS characteristics. These Action Criteria are based on the soil texture together with the volume of material which is to be disturbed to determine if the material is to be managed as an ASS. The Action Criteria was used to assess 'neutralisation' of lime treated soils.

During the reporting period there were no excavations undertaken that required initiation of the representative surface and sub-surface soil sampling and analysis programme. Excavations conducted on site were predominantly in fill imported onto site or material reclaimed from the Hunter River. The ASS risk associated with these sources of material was known to be low. Excavations were also conducted into areas of non-imported fill, specifically at Dump Station 2. However, based on experience from construction for Dump Station 1 and previous sampling, the risk of ASS in this area was low. No ASS was excavated or handled during this reporting period.

### **3.7.3 Reportable Incidents**

No incidents or complaints were reported relating to acid sulphate soils management during the reporting period.

### **3.7.4 Further Improvements**

No improvement to acid sulphate soils management is required for the next period.

## **3.8 NOISE AND VIBRATION**

### **3.8.1 Environmental Management**

In accordance with Condition 2.9, Schedule 2 of the Project Approval (06\_0009) NCIG and its contractors minimised noise emissions from plant and equipment operated on the Project site as outlined in the *NSW Industrial Noise Policy* (EPA, 2000).

In accordance with Condition 2.10, Schedule 2 of the Project Approval (06\_0009), general site preparation, filling/preloading and construction works that may generate an audible noise at any residential receptor was only undertaken between 7.00 am and 6.00 pm.

In accordance with Condition 2.11, Schedule 2 of the Project Approval (06\_0009) piling works was not conducted on Sundays or public holidays.

Construction noise management measures are further detailed in the Construction Noise Management Plan (CNMP).

In accordance with Condition 2.13, Schedule 2 of the Project Approval (06\_0009), Stage 1 of the NCIG Terminal has been designed, constructed, operated and maintained to ensure that the noise contributions from the plant do not exceed the maximum allowable noise contributions specified in Table 3.8.2 below, at the locations and the time periods indicated.

In accordance with Condition 2.14, Schedule 2 of the Project Approval (06\_0009), the assessment of noise contributions was:

- Measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with  $L_{Aeq(15 \text{ minute})}$  night noise limits.
- Measured at one metre from the dwelling façade to determine compliance with  $L_{A1(1 \text{ minute})}$  noise limits.
- Subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

In accordance with Condition 2.15, Schedule 2 of the Project Approval (06\_0009), NCIG has taken steps to ensure that trains operated on the Site meet noise performance criteria established. This includes construction of dedicated noise abatement berms directly adjacent the NCIG rail line and design and construction of the rail alignment to reduce noise from locomotive and wagon wheels.

Operations noise management measures are further detailed in the Operations Noise Management Plan (ONMP).

### 3.8.2 Environmental Performance

Table 3.8.1 outlines the monitoring locations, noise and vibration monitoring parameters recorded, frequency of monitoring and noise and vibration criteria for the Project in accordance with the CEMP and ONMP.

**Table 3.8.1: Summary of the Meteorological Monitoring Programme**

Monitoring Parameter	Monitoring Sites	Frequency	Criteria
Attended and unattended noise monitoring.	N1, N3, N5, N9, N13 and N14 <sup>1</sup> .	Monthly for first 3 months then quarterly.	See below.
Unattended continuous noise monitoring.	Selected locations.	Minimum period of one week per quarter.	See below.
Ground vibration.	Adjacent industrial receivers within 180 m of piling activities.	Weekly when piling within 180m of industrial receiver.	See CNMP.
Attended noise monitoring	All static and mobile elements of terminal operations.	Quarterly	See ONMP.

<sup>1</sup> The location of monitoring sites is shown on Figure 3.1.1.

The noise impact assessment criteria as defined by the Project approval and the Environmental Protection Licence (EPL12693) are provided in Tables 3.8.2 and 3.8.3.

Noise monitoring was undertaken by specialist acoustic consultants during the reporting period. This monitoring was conducted on a quarterly basis to coincide with both construction works on the project and operations throughout the reporting period. No piling activities were undertaken within 180m of an industrial receiver and, as such, no vibration monitoring was conducted during the period.

**Table 3.8.2: Residential Noise Impact Assessment Criteria**

Location	Day, Evening, Night At all times	Night 10:00pm to 7:00am Monday to Saturday 10.00pm to 8.00am on Sundays and Public Holidays	
	L <sub>Aeq</sub> (15 minute)	L <sub>Aeq</sub> (night)	L <sub>A1</sub> (1 minute)
Fern Bay West	41	37	57
Fern Bay East	39	36	55
Stockton West	41	37	57
Stockton East	38	35	56
Mayfield West	45	40	55
Mayfield	44	39	62
Carrington	36	33	52

Where: a) wind speeds up to 3 ms<sup>-1</sup> (measured at 10 m above ground level).  
 b) temperature inversion conditions up to 3°C per 100 m and wind speeds up to 2 ms<sup>-1</sup> (measured at 10 m above ground level).

**Table 3.8.3: Industrial Noise Impact Assessment Criteria**

Non-residential Location	Land Use	Intrusive L <sub>Aeq</sub> (15minute)			Acceptable Amenity L <sub>Aeq</sub> (period) <sup>1</sup>			Maximum Amenity L <sub>Aeq</sub> (9hour)
		Day	Evening	Night	Day	Evening	Night	Night
Mayfield West	Commercial Steel River	Intrusive noise not applicable			65	65	65	70
Kooragang Island	Industrial	Intrusive noise not applicable			70	70	70	75
Mayfield North		Intrusive noise not applicable			70	70	70	75
Any	School	Intrusive noise not applicable			External 45 when in use			50
Any	Hospital	Intrusive noise not applicable			External 50 when in use			55

Note 1: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours, Night-time 2200 hours to 0700 hours.

The monitoring undertaken principally consisted of:

- Unattended noise monitoring – two (2) Type EL316 environmental noise loggers were deployed at the nearest potentially affected receptors for a period of one week. The noise loggers were programmed to record statistical noise level indices continuously in 15 minute intervals, including L<sub>Amax</sub>, L<sub>A1</sub>, L<sub>A50</sub>, L<sub>A90</sub>, L<sub>A99</sub>, L<sub>Amin</sub> and L<sub>Aeq</sub>.
- Attended noise monitoring - operator attended noise survey was conducted at each noise logger location to assist in defining noise sources and the character of noise in the area and therefore to qualify unattended noise logging results. These measurements were conducted over 15 minute periods using a Bruel & Kjaer Type 2250 sound level meter.
- Vibration monitoring - In accordance with the CNMP, vibration monitoring was required to be conducted during construction piling activities within 180m of adjacent industrial receivers (i.e. Blue Circle Southern). As mentioned, this did not take place during the monitoring period.

The conclusion of the specialised acoustic consultants was that throughout the reporting period noise surveys identified that current construction, as well as operation of the NCIG Terminal was conducted below the relevant noise criteria.

### **3.8.3 Reportable Incidents**

No environmental incidents were reported relating to noise or vibration during the reporting period. Complaints regarding noise received during the reporting period (see Section 3.13) were responded to in accordance with the Complaint Response Procedure.

### **3.8.4 Further Improvements**

No improvement to noise monitoring is required for the next period. Notwithstanding, NCIG implements a Continuous Noise Improvement Program. The program will continue to be implemented as part of ongoing NCIG operations.

## **3.9 HERITAGE**

### **3.9.1 Environmental Management**

The DECCW advised that as the Project construction site has been the subject of extensive disturbance over a period of more than 50 years, it considers that no Aboriginal heritage objects of significance will be present (DEC, pers. comm. 15 February 2007).

Notwithstanding, the management of items of Aboriginal cultural heritage significance during construction of the Project incorporated the following elements:

- During induction training, NCIG personnel were advised of their responsibility to advise management if they uncover any item that could be of Aboriginal heritage significance.
- If potential archaeological material is identified, construction activities proximal to the potential archaeological material will cease and OEH's North East Branch - Environment Protection and Regulation Division, Regional Archaeologist will be contacted to determine appropriate management requirements.
- If items of Aboriginal cultural heritage significance are salvaged on-site, they will be stored in a keeping place on-site for the duration of the Project.
- At the cessation of the Project, if any salvaged Aboriginal objects are stored on-site their ongoing management will be determined in consultation with the Aboriginal community and the OEH.

### **3.9.2 Environmental Performance**

During the reporting period induction training was attended by all NCIG personnel. This training included information relating to aboriginal heritage and the potential identification of items of archaeological significance.

During the reporting period there were no items of potential Aboriginal cultural heritage significance identified.

### **3.9.3 Reportable Incidents**

No incidents or complaints were reported relating to heritage during the reporting period.

### **3.9.4 Further Improvements**

No improvement to heritage is required for the next period.

### 3.10 FLORA AND FAUNA

#### 3.10.1 Environmental Management

In accordance with Conditions 2.16 and 2.19, Schedule 2 of the Project Approval (06\_0009) NCIG employed two qualified ecologists (Dr David Goldney and Dr Arthur White), approved by the Director-General, to undertake a pre-construction survey of areas affected by construction works for the presence of *Litoria aurea* (the Green and Golden Bell Frog) (see Figure 3.10.1). These ecologists also provided advice on the mitigation and management of impacts to listed threatened species that may be affected by the NCIG Project works.

While Green and Golden Bell Frog individuals were not identified during the pre-construction survey, previous surveys have identified the presence of the species on the Project site. Therefore a management plan for the relocation of Green and Golden Bell Frog individuals was prepared in accordance with Condition 2.16, Schedule 2 of the Project Approval (06\_0009). The Green and Golden Bell Frog Management Plan (GGBFMP) was developed in consultation with DECC and the Regional Land Management Corporation.

In accordance with Condition 2.17, Schedule 2 of the Project Approval (06\_0009) NCIG has designed and constructed relevant rail infrastructure associated with the Project to include culverts, underpasses or other similar measures to permit the movement of *Litoria aurea* and other amphibian species under the NCIG rail infrastructure (see Figure 3.10.2). The culverts and underpasses were installed to include suitable habitat for the Green and Golden Bell Frogs and to provide protection from predators in accordance with guidance provided by Dr Arthur White.



**Figure 3.10.1: The Green and Golden Bell Frog (*Litoria aurea*)**

In accordance with Condition 2.18, Schedule 2 of the Project Approval (06\_0009) all employees and contractors involved in construction of the Project are trained in site hygiene management in accordance with *Hygiene Protocol for the Control of Disease in Frogs* (NPWS, 2001) prior to the commencement of work.

A Compensatory Habitat and Ecological Monitoring Program (CHEMP) has also been prepared to guide the construction of Green and Golden Bell Frog habitat which suitably replaces habitat damaged

or destroyed by construction works. This plan was initially submitted to DECCW (now EPA) and DoP (now NSW Planning and Infrastructure) in 2008. Through discussions and agreed amendments, the CHEMP was approved by DoP on 16 November 2010. Details of compensatory habitat work completed in the period are given in Section 3.10.3.

A Vegetation Clearance Protocol (VCP) was also prepared to satisfy those commitments of the Project Environmental Assessment (EA) that relate to vegetation clearance during construction of the Project.



**Figure 3.10.2: Amphibian underpass of rail infrastructure**

### **3.10.2 Environmental Performance**

The Green and Golden Bell Frog *Litoria aurea* is listed as Endangered under the *Threatened Species Conservation Act, 1995* (TSC Act) and Vulnerable under the EPBC Act. The Green and Golden Bell Frog is estimated to have disappeared from 90% of its former range within NSW.

Known and potential Green and Golden Bell Frog habitat is located across the Project site and surrounds. Disturbance to Green and Golden Bell Frog habitat occurred as a result of construction activities which primarily involved completely infilling Big Pond and partial disturbance of Ponds H, K and Q (see Figure 3.10.3). Most of the known and potential Green and Golden Bell Frog habitat recorded across the Project site and surrounds (i.e. Ponds A, B, C, D, E, F, G, I, J, L, O, T, U, V, AA, AC, AD) has not however been directly disturbed by Project activities.



**Figure 3.10.3: Green and Golden Bell Frog Habitat Areas.**

In order to minimise Project-related impacts on the Green and Golden Bell Frog the following management procedures were implemented in accordance with the GGBFMP:

- environmental induction training;
- site hygiene management;
- delineation of disturbance areas;
- pre-clearance surveys;
- Green and Golden Bell Frog relocation procedures; and
- construction works procedures.

All employees and contractors involved in the construction of the Project were informed about the presence and importance of the Green and Golden Bell Frog as a part of the site induction process. Similarly, operations employees and contractors are informed about the presence of the Green and Golden Bell Frog in areas adjacent to the Stage 1 operations site, in particular the NCIG rail facility. Training was also provided on appropriate site hygiene practices in accordance with *Hygiene Protocol for the Control of Disease in Frogs* (NPWS, 2001) prior to the commencement of work.

All major ground disturbance activities were completed previously on the site, therefore there were no pre-clearance surveys undertaken during the reporting period. Areas of active earthworks continued to be delineated by fencing, however, in order to prevent the movement of amphibian species back into a construction area that had been previously cleared, these fencelines were regularly monitored for the presence of the Green and Golden Bell Frog to confirm that there were no individuals in the vicinity that may be at risk.

If individual frogs were identified adjacent to the constructed delineation fencelines or elsewhere on the site, and thought to be at potential risk of harm, they were captured and translocated in accordance with the Green and Golden Bell Frog Management Plan. Details of the individual Green and Golden Bell Frogs managed in accordance to this process are outlined in Table 3.10.1.

**Table 3.10.1: Translocated Green and Golden Bell Frogs**

Date	Health	Size (cm)	Location Identified	Location Translocated
2/6/11	Good	8cm	CV09 sump	Creek behind Admin Building
23/6/11	Good	7cm	TH01 sump	Pond Q
5/8/11	Good	8cm	DS01	Pond Q
8/8/11	Good	6cm	CV02	Pond L
8/9/11	Good	7cm	CV01	Pond I
27/9/11	Good	3cm	SA02	Pond L
29/9/11	Good	2cm	DS01	Pond L
15/11/11	Good	6cm	DS01	Pond I
29/11/11	Good	7cm	SS01	Pond I
1/12/11	Good	7cm	DS02	Pond I
9/12/11	Good	6cm	DS01	Pond I
7/2/12	Good	8cm	DS02	Pond I

During the reporting period a total of thirteen (13) Green and Golden Bell Frogs were sighted on site and assessed as being at risk and subsequently translocated in accordance with the Green and Golden Bell Frog Management Plan. All specimens were alive and in good condition, ranging from 2–8cm in length. The majority of frogs were considered to be adults, based on size. Two (2) animals approximately 2 and 3cm were captured in September, which were considered to be juveniles.

In accordance with the Project requirements under the *Environment Protection and Biodiversity Conservation Act, 1999* (EPBC Act) approval, NCIG undertook Green and Golden Bell Frog monitoring during the reporting period. The overall objective of this Green and Golden Bell Frog monitoring programme is to monitor the dynamics of the Green and Golden Bell Frog within habitat areas adjacent to the Project site (within the Kooragang Island Waste Emplacement Facility), and any other locations where captured frogs have been relocated. Table 3.10.2 details the monitoring programme components.

**Table 3.10.2: Green and Golden Bell Frog Monitoring Programme**

Monitoring Component	Details
Timing	<p>Surveys will be conducted during favourable seasonal and climatic conditions (e.g. between September and February, after heavy rain). Where logistically practicable, diurnal and nocturnal monitoring surveys will be conducted for a period of approximately two to four days and generally covering the locations identified in Figure 2, and will include locations where captured frogs have been released.</p> <p>A minimum of two surveys will be conducted each year during favourable seasonal and climatic conditions. Surveys will be separated by at least 2 weeks. Monitoring will be conducted annually until 2020. Thereafter, monitoring will be undertaken on a three-yearly basis until 2030. The requirement to monitor beyond 2030 will be determined at that time in consultation with the DEWR.</p>
Locations	<p>Monitoring locations will include Green and Golden Bell Frog habitat within the Kooragang Island Waste Emplacement Facility (Figure 2) and any other locations where captured frogs have been relocated (Section 3.2)</p>
Methodology	<p>Monitoring methodology may include, however not necessarily be limited to, frog call recording, active searches, spotlighting and call playback. The monitoring programme will be conducted in accordance with <i>Threatened Species Survey and Assessment: Guidelines for Developments and Activities (Working Draft)</i> (DEC, 2004). In addition, the monitoring surveys will be conducted in accordance with relevant DECC permits.</p>
Parameters	<p>Monitoring parameters will include, but not necessarily be limited to:</p> <ul style="list-style-type: none"> <li>• Green and Golden Bell Frog presence/absence, distribution, habitat utilisation, behaviour and abnormalities.</li> <li>• Observations of other frog species distribution, relative abundance and abnormalities.</li> <li>• Observations of other threatened frog species (listed under the TSC Act and/or the EPBC Act).</li> <li>• Water quality (i.e. salinity and pH) and habitat condition.</li> </ul> <p>Additional general information recorded during monitoring surveys may include:</p> <ul style="list-style-type: none"> <li>• date;</li> <li>• time of day;</li> <li>• rainfall (mm);</li> <li>• site location (GPS co-ordinates and map location);</li> <li>• survey methodology utilised;</li> <li>• sampling effort;</li> <li>• habitats surveyed;</li> <li>• weather conditions (including temperature);</li> <li>• number of observers;</li> <li>• photographs taken; and</li> <li>• any other relevant information.</li> </ul>

The results of the monitoring programme conducted by Dr Arthur White during favourable seasonal and climatic conditions between September 2011 and April 2012 are illustrated in Table 3.10.3.

**Table 3.10.3: Green and Golden Bell Frog Monitoring Results**

	Sept 2011	Oct 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	March 2012	April 2012
A	-	-	-	-	-	-	-	-
H	-	-	-	-	-	-	-	-
I	-	-	-	-	-	-	-	-
J	-	-	-	-	-	-	-	-
K	-	-	-	-	-	-	-	-
B	Dry	√	-	Dry	-	Dry	-	Dry
C	-	√	√	√	√	√	-	-
D	Dry	√	Dry	Dry	Dry	Dry	-	Dry
DPE1	-	-	-	-	-	-	%	-
DPN	√	√	-	-	-	-	-	-
Deep Pond East	-	√	-	√		√		
F	-	-	-	-	-	-	-	-
G	√	-	-	-	-	-	-	-
P	Dry	-	-	√	Dry	Dry	-	-
Q	√	√	-	√	√	-	-	-
Dump Station Channel	-	-	-	-	-	-	√#	√@
Dead Tree Lagoon	-	-	-	-	-	-	-	-
Ash 1	-	-	-	-	-	-	-	-
Ash 2	-	√	-	-	-	-	-	-
Ash 3	-	√	√	-	-	-	@	-
Ash 4	-	√	-	-	-	-	*	-

\* – 1 GGBF seen, no calling  
 @ – 2 GGBF seen, no calling  
 # – 3 GGBF seen, no calling  
 % – 3 juvenile GGBF found near pond  
 √ – calling  
 Dry – survey location dry at the time of survey

A monitoring programme was also conducted during the reporting period to survey the utilisation of Deep Pond, adjacent to the NCIG rail infrastructure area, by bird species with the primary focus on Australasian Bittern and shorebirds. This Avifauna Monitoring Programme was undertaken by the Hunter Bird Observers Club and the resulting information was provided to NCIG by way of agreement. The results of the monthly surveys conducted during the 2011 calendar year are illustrated by Table 3.10.4. The aim of the monitoring programme is to identify the pattern of usage of Deep Pond by all birds over the annual cycle and determined the extent of any potential impact by the NCIG activities on this usage.

In comparison to the 2010 results, there has been an increase in the total number of birds using the pond from 7115 to 8178 in 2011. This is due mainly to an increase in overall pond usage during February and March. This was likely due to:

**Table 3.10.4: Avifauna Monitoring Results**

Deep Pond 2011 All months	22/01/2011	19/02/2011	18/03/2011	16/04/2011	7/05/2011	18/06/2011	16/07/2011	13/08/2011	17/09/2011	15/10/2011	11/11/2011	20/12/2011	Total
Brown Quail			8					4		1		1	14
Musk Duck						2	2	8	1	2	1	3	19
Black Swan	32	43	36	11	25	11	47	56	32	36	47	23	399
Australian Wood Duck		2							42				44
Pacific Black Duck	8	31	19	6	13			6	4	10	25	8	130
Australasian Shoveler		2			1			8					11
Grey Teal		16	87	12	6			250	305	400	235	120	1431
Chestnut Teal	348	688	1637	435	265			160	182	300	52	170	4237
Hardhead					2		6	8	24	60	2	8	182
Australasian Grebe			6	8	4	7	9	17	37	30	27		145
Hoary-headed Grebe			1					8	9	11			29
Darter		1									1	1	3
Little Pied Cormorant							1		4	2			7
Pied Cormorant		1											1
Little Black Cormorant	37	37	2						1		4	2	83
Great Cormorant	11	6							1	2	3		23
Australian Pelican	1	7		7	1			1	1				18
White-faced Heron	3							2					5
Little Egret	2	9								2			13
Great Egret	1	2	3		2			1	5	1	2	1	18
Intermediate Egret												1	1
Australian White Ibis		2	3		1								6
Royal Spoonbill		26	19	2									47
Black-shouldered Kite		1	2										3
Whistling Kite		1	1				1	1	2				6
White-bellied Sea-Eagle		1	1			2	1	1	1			4	7
Swamp Harrier			1	1			1		1	1	1	3	7
Brown Falcon							1					63	1
Australian Hobby											1		1

Deep Pond 2011 All months	22/01/2011	19/02/2011	18/03/2011	16/04/2011	7/05/2011	18/06/2011	16/07/2011	13/08/2011	17/09/2011	15/10/2011	11/11/2011	20/12/2011	Total
Buff-banded Rail		1											1
Lewin's Rail		1							1	1			3
Purple Swamphen	2		2	4			5	4	4	15	1	1	41
Dusky Moorhen										6	2	2	11
Eurasian Coot									9	80	73	73	225
Black-tailed Godwit		17	101	35									153
Eastern Curlew			40										40
Marsh Sandpiper		9	14										23
Common Greenshank		18	1										19
Wood Sandpiper		1											1
Curlew Sandpiper				2									2
Black-winged Stilt		37	143	108	72					4			364
Red-necked Avocet			48	48								26	122
Black-fronted Dotterel		2	11	15	2	3	2	1					36
Masked Lapwing	2	2	11	6	2		8		2				33
Silver Gull		1	2	62									65
Caspian Tern			3	1									4
Superb Fairy-wren										6			6
White-fronted Chat			7										7
Magpie-lark			18										18
Australian Raven									2				2
Richard's Pipit			2						1				3
Chestnut-breasted Mannikin			10										10
Welcome Swallow			30						2				32
Clamorous Reed-Warbler										4		10	14
Tawny Grassbird						1			2			1	4
Little Grassbird			2			1	2	1	4	4		2	16
Golden-headed Cisticola							6	4	6	12		4	32
	447	965	2271	763	396	27	92	541	685	990	477	477	8178

Source: Hunter Bird Observers Club

- the use of Deep Pond as a drought refuge for shorebird and waterfowl species when inland water bodies are low.
- a drop in water levels over the February/March period.
- a readily available food source associated with a drop in water levels.

The monitoring period saw the return of several waterfowl species such as Teal, Grebes and Hardheads. These are likely to have returned after a period of dry weather at inland locations.

The Vegetation Clearance Protocol (VCP) was implemented to minimise impacts on threatened flora and fauna species within the Project area. The key components of the VCP are outlined below and include:

- delineation of areas to be cleared of existing vegetation;
- pre-clearance surveys;
- managing impacts on fauna; and
- vegetation clearance procedures.

The delineation of areas that were identified to be cleared of existing vegetation was undertaken to prevent any accidental damage to vegetation not targeted for removal. Pre-clearance surveys involved habitat assessments to identify potential habitat features located within areas requiring vegetation clearance for construction of the Project.

Features with the potential to provide roosting and/or nesting resources for birds and/or arboreal mammals (e.g. grass tussocks and hollow openings, cracks, loose bark of trees) or shelter and/or breeding resources for frogs and/or reptiles (e.g. grass swales, grass tussocks and rock crevices) were identified during the habitat assessment.

Following the preliminary habitat assessment, a secondary habitat assessment was conducted to assess the usage of habitat features by fauna. The secondary habitat assessment may include:

- active searches and/or spotlighting for arboreal mammals, frogs and or reptiles; and/or
- observation of hollows and nests/roosts for usage by bird species.

The vast majority of vegetation clearance occurred during the 2008-2009 reporting period. Some isolated areas of vegetation were cleared during this period. For these areas the vegetation clearance procedure was undertaken either by the approved ecologist (Dr Arthur White) or by an appropriate NCIG environmental representative. Each of the assessments undertaken determined that there was no habitat or fauna species of significance within the delineated areas of vegetation. Areas of vegetation were felled/cleared as soon as practicable following the completion of the pre-clearance surveys habitat assessments to ensure that the occupation status of the cleared area did not change in the intervening time period.

### **3.10.3 Compensatory Habitat and Ecological Monitoring Program**

A number of works have been undertaken in relation to the CHEMP between April 2011 and March 2012. The following points highlight the major works undertaken and milestones achieved during this reporting period.

**Consultative Board** – The first and second Consultative Board meetings were held on 28 July 2011 and 10 November 2011. The purpose of these meetings are to provide information on the Compensatory Habitat planning works completed to date and provide guidance on works to be completed, particularly in the coming 12 months. The Board consists of representatives from NSW Planning and Infrastructure, NSW Office of Environment and Heritage, Hunter-Central Rivers

Catchment Management Authority, the University of Newcastle, the DoPI-Approved Ecologist for the NCIG Project and NCIG. The Terms of Reference for the Board were reviewed and updated during the first meeting. At each meeting, papers have been presented on a range of topics for the consideration and discussion of Board members. The topics discussed include:

- Land allocation process;
- Research initiatives;
- Population modelling;
- Population of constructed habitat;
- Deep Pond compensatory works; and
- Ameliorative works.

**Research** – Detailed discussion was undertaken in February and March period of 2011 with Newcastle University in relation to potential research topics. This included focus meetings and assessment and investigation of existing research and facilities at the University of Newcastle. Newcastle University provided a proposal detailing preferred research on 30 August 2011 and through further discussion two potential topics were identified for further investigation (see attached). These research topics were peer reviewed by the NCIG Approved Ecologist and an independent third party and presented to the Consultative Board.

The Consultative Board recommended at the July 2011 meeting that NCIG should commence with the proposed research topic relating to behavioural aspects of the Green and Golden Bell Frog. The research aims to investigate the attractant for GGBF to particular waterbodies which will aid in the development of compensatory habitat.

Commercial arrangements for the commencement of the research were finalised in December 2011 and the research was commenced. Pilot studies both in the field and laboratory were completed within the reporting period, with the results communicated to the Consultative Board through a discussion paper.

**Population Modelling** – The Compensatory Habitat Ecological Monitoring Program (CHEMP) included a provision for NCIG to undertake analyses to determine the pre-impact levels of the population of GGBF in the project area. This was expected to be achieved through population modelling, utilising ecological software or Bayesian programming.

NCIG commissioned a statistician (Mr Ian Lenane – Gilberts and Associates Pty Ltd) in April 2011 to review the available data sets and to assess the use of software to accurately determine the pre-impact levels of the population of GGBF. Lenane concluded that in the absence of suitable historic (pre-impact) mark and recapture data it is not possible to use ecological software to accurately determine the actual pre-impact population size of the GGBF within the developed areas.

In accordance with Condition 2.20 of the Development Approval NCIG undertook *ecological surveys of the project area to identify and quantify the extent and types of habitat that would be lost or degraded as a result of the project.*

A paper was presented to the July 2011 Consultative Board meeting. The Board validated that as the required mark-recapture information was not collected prior to site disturbance, it is not possible to retrospectively undertake this population modelling for the NCIG project area. The Board recommended that future opportunities be sought to utilise population modelling to further the understanding of dynamics of the GGBF population on Ash Island.

At the end of this reporting period NCIG were considering the opportunity to implement mark-recapture monitoring/data in the proposed trial compensatory habitat area to progress population modelling and investigate utilisation of the constructed habitat.

**Compensatory Works** – In the previous reporting period, NCIG commenced discussion with government regulators in regards to the process of gaining access to land on Ash Island as per

previous commitments by DECCW. With the inclusion of the identified Ash Island area into the Hunter Estuary National Park, NCIG undertook initial discussions with NPWS in relation to habitat construction as outlined below. NPWS was able to outline the necessary due diligence and approval processes that they would require to facilitate these proposed works. Due diligence and approval work completed in the reporting period includes:

*Land Characterisation:*

- Upon agreement with NPWS on the broad suitability of an identified land area on Ash Island, detailed investigations were commenced to meet due diligence requirements and finalise any constraints/limitations to habitat construction.
- A scope of works for the due diligence processes was developed in March 2011 in consultation with NPWS. This document was then utilised to engage specialist services to define the suitability and any limitations of land on Ash Island for the construction of compensatory habitat.
- A flora assessment was conducted in April 2011 by a specialist consultant (Flora Search). The preliminary assessment was completed in July 2011 and provided vegetation maps for the identified area. The flora assessment provided detail of areas of existing important ecological communities, however, it also confirmed the suitability of the area for habitat construction.
- A fauna habitat assessment was conducted by the approved NCIG Project Ecologist (Dr Arthur White) in April 2011. This assessment was completed in July 2011 and involved the study of the identified area on Ash Island to define any existing fauna that would limit the proposed habitat creation. It was determined that there are no faunal factors that would limit the proposed activity. Areas adjacent with previous GGBF sitings confirm the suitability of the identified area to habitat creation.
- Discussions were held with a number of utilities in a process to identify any services that may exist in the land area on Ash Island. It was determined that a high pressure gas main presents some limitation to the creation of habitat and discussions with the Jemena Gas are ongoing.
- A critical element to the success and future arrangement of constructed habitat was identified as the soil, surface water and groundwater characteristic of the identified area. Upon receiving access approval from NPWS in October 2011, NCIG engaged RCA Australia to conduct sampling and analysis of soil and water bodies on Ash Island over the November 2011 to February 2012 period to determine any limiting factors to the success of the proposed works. This assessment provided a range of readings for various soil and water parameters and was also utilised to inform the habitat design process.
- On confirmation of the suitability of the identified area for habitat construction through the above due diligence process, a detailed survey was conducted by specialist surveyors Monteath & Powys. This survey was utilised to define the layout of the proposed habitat to ensure that the overall design takes into account of any existing topography and is sympathetic with the surrounding environment.

*Access Approvals:*

- The National Park status of the proposed land area requires that a process is followed to facilitate access. This requires completion of Review of Environmental Factors (REF) to enable a determination and approval provided by NPWS. NCIG has been working closely with NPWS to ensure that the appropriate level of approval is gained prior to accessing and/or disturbing the site.
- Approval was sought from NPWS in October 2011 to enable the determination of soil, surface water and groundwater characteristic. A REF was submitted to NPWS to enable this works to be undertaken on Ash Island. Approval for this work was provided by NPWS in December 2011 and this investigative work commenced.
- An important aspect of the success of any constructed habitat is the creation of an environment conducive to the survival of the GGBF. This requires careful consideration of the physical parameters of the habitat including the type of

vegetation that is to be established. The requirement of NPWS is that defined vegetation be collected from the Hunter Estuary National Park for latter utilisation in the habitat creation. Consent to undertake these activities was sought in July 2011 and provided by NPWS on 28 November 2011, with wetland plant species having been collected and propagated by a specialised local nursery. These plants will be established in accordance with design principles in the constructed ponds.

- With the identification and defined suitability of the proposed land, NCIG has been discussing with NPWS the construction of a trial habitat site. This has included a forum in March 2012 involving NCIG, Newcastle University, NPWS and the approved ecologist to discuss pond design and overall habitat layout. This work will culminate in a REF being submitted to NPWS shortly after this reporting period seeking approval to commence the construction of a trial GGBF habitat area on Ash Island. This submission included updated flora and fauna assessments that focused on the potential impacts on the proposed trial area.

*Breeding Population:*

- NCIG commenced discussions with Newcastle University to establish a captive breeding program. This program will facilitate the stocking of the constructed habitat with GGBF tadpoles during the 2012/2013 season. A captive population was being maintained at the university during the reporting period which was utilised to stock the BHPBilliton trial ponds. NCIG and the university are working collaboratively on a translocation proposal to enable the existing captive population to be utilised for the NCIG project.

**Ameliorative Works** – In consultation with NPWS and CMA, NCIG constructed a water management structure in Creek 5 on Ash Island prior to this reporting period. This structure was designed to enable manipulation of the hydrology of the area known as Swan Pond with the aim to limit mangrove propagation and reduce the area of existing mangroves in this area to benefit the sustainability of the existing saltmarsh community. NCIG continued to work with CMA during the reporting period to define a collaborative approach to achieving the desired aims in this area.

**Table 3.10.5: CHEMP Annual Works Program – April 2011 - March 2012**

<b>Works/Milestone/Stage</b>	<b>Intended Completion Date</b>
Consultative Board Meetings	May and November 2012
Submission of REF for construction of GGBF trial compensatory habitat on Ash Island, to NPWS	April 2012
Approval of trial GGBF compensatory habitat on Ash Island	June 2012
Construction of GGBF trial compensatory habitat on Ash Island	3rd Quarter 2012
Planting of vegetation growing in Hunter Wetlands Centre Nursery for planting in constructed habitat	3rd Quarter 2012
Populating of trial habitat with captive-bred Green and Golden Bell Frogs	4th Quarter 2012/1st Quarter 2013
Commencement of Mark/Recapture GGBF Monitoring in trial site	1st Quarter 2013
Continuation of Behavioural Research on the Green and Golden Bell Frog by the University of Newcastle	Throughout the coming reporting period
Implementation of hydrological management controls in Creek 5 (Fish Fry Creek) to limit propagation and reduce existing area of mangroves	3rd Quarter 2012

**3.10.4 Reportable Incidents**

No incidents or complaints were reported relating to flora and fauna management during the reporting period.

### **3.10.5 Further Improvements**

Aside from ongoing implementation of the Compensatory Habitat and Ecological Monitoring Program, no improvement to flora and fauna management is required for the next period.

## **3.11 TRAFFIC MANAGEMENT**

### **3.11.1 Environmental Management**

The Project Approval (06\_0009) contains a range of requirements that pertain to road transport (Conditions 2.21 to 2.37, Schedule 2). These requirements are addressed where relevant in the Construction Traffic Management Protocol.

### **3.11.2 Environmental Performance**

The road improvements proposed to conform to the Conditions of the Project Approval for the construction phase of the CET are generally those permanent works that would be required during the future operation of the proposed coal loader.

Traffic management during the construction phase focussed on the immediate imposition of movement restrictions at key intersections to limit the potential for delays to traffic flows on Cormorant Road.

NCIG has developed a Vehicle Traffic Management Plan (VTMP) in accordance with the Construction Traffic Management Protocol. This plan provides the approved traffic routes for NCIG construction traffic across the site. This plan also dictates the approved traffic routes for construction traffic on adjacent public roads, including the prevention of right-hand turns onto Cormorant Road from Egret Street, Pacific National Road and the NCIG Wharf Access Road intersection, in order to minimise any disruption to through traffic on this road. Each contractor on the NCIG project site also developed VTMPs to ensure that construction traffic is adequately managed on internal and external roads.

During the reporting period, NCIG completed works on the Pacific National Road and NCIG Wharf Access Road intersections with Cormorant Road. Approval was gained from the NSW Roads and Traffic Authority (now Roads and Maritime Service) in the previous reporting period to undertake works on three intersections on Cormorant Road, including the Egret Street intersection. Work was completed for the Egret Street intersection during the previous period.

In addition to the above, a Vehicle Traffic Management Plan has been developed for operational vehicles which came into effect at the commencement of NCIG operational activities.

### **3.11.1 Reportable Incidents**

No incidents or complaints were reported relating to traffic management during the reporting period.

### **3.11.2 Further Improvements**

No improvement to traffic management is required for the next period.

### **3.12 WASTE MANAGEMENT**

#### **3.12.1 Environmental Management**

Measures to avoid and minimise the generation of wastes and promote waste re-use and recycling have been adopted during construction of the Project and include:

- waste avoidance – practices were developed that reduce the amount of waste on-site, via selective purchasing procedures and the use of bulk purchasing, where practicable;
- material reuse – reuse of recyclable or reusable materials where practicable; and
- recycling – materials such as metals, oil, timber, plastics, glass and paper were recycled where practicable.

In accordance with Conditions 2.54 and 2.56, Schedule 2 of the Project Approval (06\_0009), all waste materials removed from the site was directed to a waste management facility lawfully permitted to accept the materials.

In accordance with Condition 2.57, Schedule 2 of the Project Approval (06\_0009), waste was not received at the site during the reporting period. In addition, NCIG complied with the requirements of EPL No. 6437 as it relates to the on-going management of the Kooragang Island Waste Emplacement Facility.

#### **3.12.2 Environmental Performance**

The principles of waste management, being waste avoidance, material reuse and recycling have been adopted by NCIG and all construction contractors on the site during the reporting period. The focus of this process has been the avoidance of waste, however the recycling of waste products was also actively pursued with paper, aluminium, steel, plastics, timber and glass being the primary materials collected. Recycled concrete has also been incorporated into the pavement design for the rail and stockyard areas as a means of improving reuse of waste materials.

A 12,000 litre (L) waste oil tank was installed prior to operations to enable the collection and storage of waste hydrocarbons during NCIG operational activities, before being removed by licensed waste transporters on a periodic basis. A purpose built oil/water separator system has also been installed at the workshop and truck washdown areas, which is inspected and maintained on a regular basis during operations.

A Waste Management Plan has been developed and incorporated into the environmental management system for the operations of the NCIG Terminal.

During the reporting period there was no waste material stored, treated, processed or reprocessed or disposed of on the Kooragang Island Waste Emplacement Facility that would constitute a breach of the conditions of EPL No. 6437.

#### **3.12.3 Reportable Incidents**

No incidents or complaints were reported relating to waste management during the reporting period.

#### **3.12.4 Further Improvements**

No improvement to waste management is required for the next period. A Waste Management Plan has been incorporated into the environmental management system for the operational site.

### 3.13 COMMUNITY RELATIONS

#### 3.13.1 Environmental Management

During Project construction the following complaints handling system was implemented:

- In accordance with Conditions 6.2, Schedule 2 of the Project Approval (06\_0009), NCIG established a telephone number, postal address and email address prior to the commencement of construction for community complaints and enquiries. Current details are provided below:
  - 24-hour complaints telephone hotline: 1800 016 304
  - Postal address for written complaints: PO Box 644  
Newcastle NSW 2300
  - Email address for electronic complaints: [enquiries@ncig.com.au](mailto:enquiries@ncig.com.au)
- In accordance with Condition 6.2, Schedule 2 of the Project Approval (06\_0009), the community were informed of the phone, email and postal addresses via the NCIG website ([www.ncig.com.au](http://www.ncig.com.au)), notices in local newspapers and signage adjacent to the Project site.
- In accordance with Conditions 6.3, Schedule 2 of the Project Approval (06\_0009), NCIG recorded all complaints received in a Complaints Register.
- In accordance with Condition 6.4 of the Project Approval (06\_0009), NCIG established and maintained a website for the provision of electronic information associated with the Project including all relevant Management Plans.

#### 3.13.2 Environmental Performance

The general structure of Complaint Response Procedure is shown on Figure 3.13.1. Upon receiving a complaint all details relating to the issue of concern were recorded in the Complaints Register including:

- the date and time, where relevant, of the complaint;
- the means by which the complaint was made (telephone, mail or email);
- any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
- the nature of the complaint; and
- a record of any operational or meteorological conditions that may have potentially contributed to the complaint.

Within 2 working days of a complaint being registered, an initial response was provided to the complainant and a preliminary assessment commenced to determine likely causes of the complaint using relevant available information (i.e. climatic conditions, environmental monitoring results and current construction activities). Table 3.13.1 provides a summary of the complaints received during the reporting period. In every case the investigation of the complaint determined that the issue of concern was not as a result of an exceedence of relevant Project Approval or EPL criteria.

The outcome of the complaints handling process was recorded in the Complaints Register, including:

- action taken by NCIG in relation to the complaint, including all follow-up contact with the complainant; and
- details of the finding of the investigation and the reason(s) why no action was taken.

Every effort was made to ensure that the concerns of the complainant were addressed in a manner that resulted in a mutually acceptable outcome.

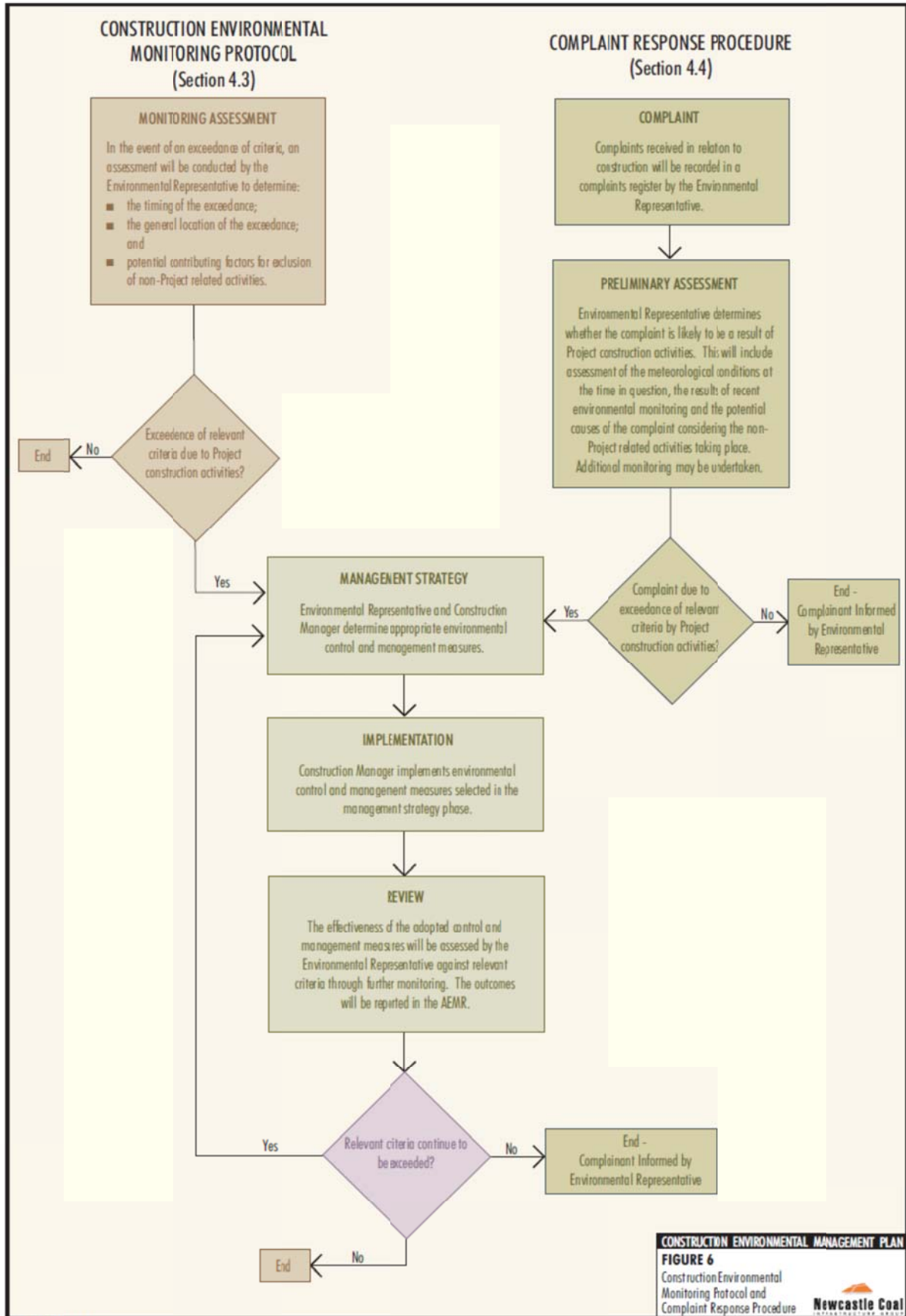


Figure 3.13.1: Complaint Response Procedure

**Table 3.13.1: Community Complaints Register Summary**

Date of Complaint	Environmental Concern Raised	Issue	Action Taken
21/6/2011	Dust	Drove past the NCIG site and believed coal dust had contacted their car.	Immediate contact made with complainant. NCIG representative explained how NCIG Dust Management System operates. Complainant commented they would pursue the matter further to have their car cleaned. NCIG representative welcomed any further contact to discuss the issue. No further contact made by complainant.
12/7/2011	Dust	Complainant drove past NCIG site twice in one day and saw dust coming from stockpiles and unloading activities. Complainant did not see sprays operating.	NCIG representative made contact with complainant and explained that stockpile sprays are not always visible from Cormorant Road. Complainant mentioned that coal dust fallout was also being noticed at Fern Bay residence. Explained that Dust Management System is being improved ongoing. Offered to provide weather details on day of complaint. Complainants insisted this was not necessary
12/7/2011	Dust	Drove past NCIG site and noticed a "black cloud" move across the roadway. Thought sprays should be going. Also noticed stacking and gusty conditions.	Contacted complainant immediately. Discussed the circumstances observed. Explained NCIG's Dust Management System is not always visible from Cormorant Rd. Complainant explained they also felt dust hit their car. NCIG committed to investigating site activities and wind direction at the time of observation. Follow up complainant on following day with result of investigation.
12/7/2011	Dust	Complainant spoke of dust increasing at their neighbouring property.	Informed by complainant that they had commissioned a dust study to investigate dust since NCIG development. Invited NCIG to visit site and take pictures/samples. Said dust was building in last 4 days due to strong westerlies. NCIG visited site, took photos and samples. Committed to have these analysed and that results would be communicated.
24/8/2011	Traffic	Complaint about a rock that came of a truck exiting the NCIG site. Complainant indicated that they were driving up Egret and turned onto Raven Street and came in behind a truck that had exited the NCIG site. They said a rock came off the truck and they had to swerve so that it didn't hit their car. They believed it came from between the tyres.	Assured complainant that there was a site procedure for checking tyres before leaving site and that the construction contractors in relation to incident would be spoken to, as well as the need to make sure these inspections are undertaken properly. Spoke to construction, who spoke to haulage contractors to reinforce importance of undertaking truck tyre inspections

Date of Complaint	Environmental Concern Raised	Issue	Action Taken
24/8/2011	Water and Dust	Resident of Fern Bay called to enquire about environmental matters. They were concerned that NCIG were approached by a coal seam gas drilling organisation to take their waste water to use for dust suppression. Also mentioned that they have issues with dust at times.	Spoke to complainant and assured them that NCIG were not approached by Dart Energy to take waste water from their operations. This is not something that NCIG would contemplate.
26/8/2011	Dust	Resident of Stockton called to complain about dust that is accumulating on their house. They believed the dust was originating from the NCIG coal stockpiles and has been falling on his house for some time. Was also concerned about the possible health effects of this dust.	Called complainant and discussed issue with dust. Made arrangement to visit residence to discuss further and potentially collect sample. Went to complainant's residence to discuss issues with dust. Major concern is dust causing additional cleaning and potential health impacts. House had recently been cleaned so no sample could be taken. Resident said they would call back if dust got bad again. Did not eventuate.
29/8/2011	Dust	Complaint of dust getting inside house which they believed was coming from NCIG stockpiles.	NCIG offered to come to house and have a look and potentially take a sample but complainant stated dust not too bad at the moment. They said they would call back if it got bad again.
30/8/2011	Dust	Stockton resident rang with concerns relating to dust depositing on house over long period. Getting dust on the front of the house and have to keep windows and doors shut to stop it coming into the house. They believe the source of this dust is the NCIG stockpiles.	Call back resident and discussed issue with dust getting into house. Made arrangement to visit residence and go through in further detail. Met with residents and discussed their issue with dust. They have an ongoing issue with dust getting inside their house leading to the need for further cleaning to be undertaken. NCIG went through the NCIG dust management system and explained how it operates. NCIG took a dust sample from the back table/chairs that were sent for analysis. Provided copy of dust analysis report to resident that found low (4.4%) coal content in dust sample.
31/8/2011	Dust/Odour	Mayfield resident lodged a complaint about dust and smell in area. They had a light coloured house and had to wash it every 2/3 weeks due to dust accumulation.	1/09/11 0845hrs called and left message. 05/09/11 0930hrs called and left message. Unable to be reached.

Date of Complaint	Environmental Concern Raised	Issue	Action Taken
3/9/2011	Dust	Member of public made complaint in relation to dust saying that it is making their home dirty and it has been going on for 2 years now. Expressed that it is getting worse.	Visited house and discussed issue of dust accumulation in house and on windows/sill etc. Found that dust was grey in colour and was unlikely to be coal dust
14/9/2011	Dust	Stockton resident rang to enquire about NCIG dust management. They wanted to know if NCIG were monitoring for dust in Stockton and what is NCIG doing about dust management. Believes coal dust a problem in Stockton.	Spoke to resident and outline NCIG dust management system. Provided a plan of monitoring locations as requested. Resident will call back with a suitable time to meet and go through concerns in further detail. Agreed to site visit when time suits
20/9/2011	Dust	Stockton resident rang and complained about dust from the NCIG site. They specifically mentioned coal dust coming from the coal stockpiles what they observed while stopped on Cormorant Road. Acknowledged there was considerable dust from other sources as well. Wanted to know why our sprays were not on.	Spoke to resident and explained that spray guns are operating and that at time of call were on a continuous cycle around the stockyard. They described seeing coal dust coming off stockpiles and that there was a lot of dust on their house and car. I stated that an inspection had been recently completed and dust levels from stockpiles were moderate. Offered to visit residence to collect dust sample to quantify coal content. Offer for site visit was declined.
28/9/2011	Dust	Complaint in relation to the dust accumulating in their neighbouring office. They find it particularly bad on windy days such as the previous week and believe the source of the dust is coal from NCIG	Visit office on Kooragang Island and discussed dust issue. Took sample of dust for further analysis. Provide copy of report to complainant. Complainant did not pursue matter further.

Date of Complaint	Environmental Concern Raised	Issue	Action Taken
20/11/2011	Dust	Stockton resident made a complaint that coal dust was being deposited on their house and in their pool during gusty NW winds. They suspect that the dust was originating from NCIG coal stockpiles.	Spoke with complainant in regards to concerns. Saw wind blowing from the NW and concluded that NCIG was the likely source of dust. Committed to finding out about specific dust management measures taken on site during time of complaint and to respond on 21/11. Reported to complainant the use of dust suppression sprays on site and the increased frequency of the gun sequence. Commented on photos taken by NCIG of stockpiles showing no sign of visible dust. Complainant was satisfied with the response and did not require any follow up.
29/11/2011	Weed Spraying	A motorist was driving along Cormorant Road and noticed that spraying activities were occurring along the inside of the fence on the northern side of Cormorant Road. The spraying was being undertaken in windy conditions. The motorist reported that as they passed the vicinity of spraying they felt spray drift come through the window of the car.	Spoke with complainant to discuss details. Confirmed there were spraying activities being undertaken along the fenceline adjacent Cormorant Rd. Complainant was satisfied with how NCIG handled the enquiry. Wanted to know more details about how the enquiry was handled (hotline). Reported to Complainant how the enquiry was handled by the complaints line. They were satisfied with this response. Complainant did not require any follow up.
5/1/2012	Dust	A Maitland resident rang to enquire about what they could do to improve rail noise at his residence. They were frustrated by no response from rail providers so rang NCIG complaints line.	Spoke to resident and complaint specifically relates to noise from trains in Maitland area. Agreed that this is not NCIG responsibility but was able to provide some guidance in getting some response from rail providers

Date of Complaint	Environmental Concern Raised	Issue	Action Taken
21/1/2012	Traffic	A motorist reported to NCIG security that they had been travelling west along Cormorant Road and a truck and dog pulled out of the NCIG and was travelling in same direction. The motorist was behind the truck when a rock flew out and struck the vehicle in the front grille area. The motorist stopped and spoke to truck driver at Industrial Drive lights and then came back to the NCIG wharf site and reported incident to security and Construction Contractors.	Spoke to motorist and provided information available from initial investigation. Construction pursued issue with complainant. Motorist pleased with quick response and outcomes.

In addition to the management of community complaints, NCIG also chairs a community meeting in the form of a Community Reference Group (CRG). This group has met during previous reporting periods, with discussions and issues primarily focussing on works relating to the NCIG construction project. Members of the group were contacted during the reporting period regarding their interest in holding another CRG meeting, but declined as there were no significant issues relating to the community to be discussed.

NCIG has also developed an initiative titled the Community Support Program. This process involves engagement with local community groups and providing support to community based events and projects. The Program seeks applications on a six monthly basis from community groups that are seeking support for their endeavours. NCIG would undertake an assessment process and provide primarily financial support to these community events and projects. NCIG participated with the community groups in these project and events wherever possible. Through this process groups within the Fern Bay, Stockton, Mayfield and greater Newcastle area were assisted by NCIG.

A Project newsletter was also prepared by NCIG and distributed to surrounding residents of the suburbs of Fern Bay, Stockton, Mayfield West, Mayfield East, Mayfield North, Warrabrook, Tighes Hill, Sandgate and Shortland. The newsletter provided residents with general information relating to the Coal Export Terminal. Specifically information was provided on the progress of operational activities and to notify residents of the commencement of Stage 2AA of Project construction activities and outline noise and vibration generating construction activities to be undertaken that may affect their noise and vibration amenity. The newsletter included details for registering community complaints and enquiries (i.e. telephone number, postal address and email address).

The chronology of community liaison held during the reporting period is outlined in Table 3.13.2.

**Table 3.13.2: Community Liaison Summary**

Date	Type
April 2011	Community Support Program
August 2011	Community Newsletter
October 2011	Community Support Program
November 2011	Community Newsletter

**3.13.3 Reportable Incidents**

No incidents were reported relating to community relations during the reporting period. Complaints received during the period are detailed in the section above.

**3.13.4 Further Improvements**

No improvement to community relations is required for the next period.

**3.14 ENVIRONMENTAL MONITORING PROGRAM**

An Environmental Monitoring Programme was implemented to monitor the environmental performance of the Project during construction in accordance with the Project Approval (06\_0009), environmental licences and other statutory conditions. The programme was established and implemented at the commencement of construction works.

The Environmental Representative was responsible for the implementation of the construction environmental monitoring programme and is responsible for ensuring that adequate environmental monitoring is maintained throughout the Project construction.

The details of the monitoring undertaken are provided in the previous sections, however, an overview of the Environmental Monitoring Programme, as they are in both the Construction Environmental Management Plan (CEMP) and Operations Environmental Management Plan (OEMP), is provided in Tables 3.14.1 and 3.14.2.

**Table 3.14.1: Construction Environmental Monitoring Program**

Monitoring Focus	Monitoring Sites	Frequency	Criteria
<b>Meteorology</b>			
Temperature, relative humidity, net solar radiation rainfall, wind speed and direction and sigma theta (rate of change of wind direction).	Project automated meteorological station <sup>1</sup> .	Continuously monitored and the data averaged over 15 minute periods.	N/A
<b>Erosion and Sediment Control</b>			
Structural stability and effectiveness in controlling sediment migration.	Drainage, erosion and sediment control infrastructure.	Monthly and following significant rainfall events (i.e. greater than 20 mm in 24 hours).	Structural stability and sediment load
<b>Noise</b>			
Attended and unattended noise monitoring.	N1, N3, N5, N9, N13 and N14 <sup>1</sup> .	Monthly.	Contained in EPL12693 and Construction Noise Management Plan
Unattended continuous noise monitoring.	Selected locations.	Minimum period of one week per quarter.	
Attended noise monitoring.	Reference locations proximal to the Project <sup>1</sup> .	At the commencement of night-time land-based dredging support works and at two monthly intervals thereafter.	
<b>Air Quality</b>			
Dust deposition <sup>2</sup> .	DG1, DG2, DG3, DG4, DG5, DG6 <sup>1</sup> , HVAS1, HVAS2, HVAS3, HVAS4, EBAM1, EBAM2, EBAM3, EBAM4	Monthly.	Maximum increase of 2g/m <sup>2</sup> /month, up to a maximum of 4g/m <sup>2</sup> /month, relevant NEPM and NHMRC Guidelines
<b>Vibration</b>			
Ground vibration.	Adjacent industrial receivers within 180 m of piling activities.	Weekly during piling activities.	Contained in Construction Noise Management Plan
<b>Surface Water</b>			
pH, electrical conductivity (EC), total dissolved solids (TDS) and total suspended solids (TSS).	Primary settling ponds and EPL Release Point.	Weekly.	Contained in Construction Surface Water Management Plan
	Surface water monitoring sites.	Monthly.	
	Excavation sites that have accumulated water.	Weekly.	
Water level.	Primary settling pond and EPL Release Point.	Following heavy rainfall (i.e. more than 20 mm of rainfall in a 24 hour period).	
<b>Groundwater</b>			
pH, EC, TDS, TSS, sulfate, polycyclic aromatic hydrocarbons (PAH), As III, Cd, Cu, Pb, Hg, Zn, Cr VI, Mn and Ni (refer Table 5).	GW1, K9/3S, K9/3N, K11/1S, K11/1.	Monthly.	Contained in EPL12693
Groundwater level.		Monthly.	Contained in Construction Environmental Management Plan
<b>Acid Sulfate Soils</b>			
Presence of acid sulfate soils or potential acid sulfate soils.	Excavation sites.	Prior to any excavation.	Contained in Acid Sulphate Soil Management Plan
	ASS treatment area.	After treatment.	

<sup>1</sup> The location of monitoring sites is shown on Figure 3.1.1.

<sup>2</sup> Dust deposition was analysed in accordance with AS/NZS 3580.10.1-2003 *Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method*.

**Table 3.14.2: Operations Environmental Monitoring Program**

MONITORING FOCUS	MONITORING SITES	FREQUENCY	CRITERIA
<b>Meteorology</b>			
Temperature, relative humidity, net solar radiation rainfall, wind speed and direction and sigma theta (rate of change of wind direction).	Project automated meteorological station <sup>1</sup> .	Continuously monitored and the data averaged over 15 minute periods.	N/A.
<b>Erosion and Sediment Control</b>			
Structural stability and effectiveness in controlling sediment migration.	Drainage, erosion and sediment control infrastructure.	Monthly and following significant rainfall events (i.e. greater than 20 mm in 24 hours).	See Appendix C.
<b>Noise</b>			
Attended and unattended noise monitoring.	Fern Bay, Stockton, Mayfield, Carrington per Section 4.2 ONMP.	Quarterly.	See Appendix B.
Attended noise monitoring in case of complaint.	Reference locations proximal to the Project <sup>1</sup> .	At the commencement of operation.	
<b>Air Quality</b>			
Dust monitoring.	DG1, DG2, DG3, DG4, DG5, and DG6 <sup>1</sup> .	Monthly	See Appendix A.
	HVAS1, HVAS2, HVAS3 and HVAS4	Every 6 days	
	EBAM1, EBAM2, EBAM3 and EBAM4	Continuous	
	PWCS	Through regular consultation	
<b>Surface Water</b>			
pH, electrical conductivity (EC), total dissolved solids (TDS) and total suspended solids (TSS).	Secondary settling ponds <sup>4</sup> .	Monthly.	See Appendix C.
	Surface water monitoring sites <sup>4</sup> .	Monthly.	
Water level.	Primary and secondary settling ponds <sup>4</sup> .	Following heavy rainfall (i.e. more than 20 mm of rainfall in a 24 hour period).	
Drainage, erosion and sediment control	All areas of NCIG	Monthly.	
<b>Groundwater</b>			
pH, EC, TDS, TSS, sulfate, polycyclic aromatic hydrocarbons (PAH), As III, Cd, Cu, Pb, Hg, Zn, Cr VI, Mn and Ni (refer Table 5).	GW1 <sup>1</sup> .	6 Monthly.	See Appendix C.
Groundwater level.		6 Monthly.	

<sup>1</sup> The location of monitoring sites is shown on Figure 4.

<sup>2</sup> Dust deposition will be analysed in accordance with AS/NZS 3580.10.1-2003 Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method.

<sup>3</sup> PM<sub>10</sub> will be monitored in accordance with the Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (EPA, 2001).

<sup>4</sup> The location of monitoring sites is detailed in the OWMP (Appendix C) and Figure 4.

## 4 COMPLIANCE AUDITS

Audits were undertaken in relation to NCIG Construction activities which considered the compliance status of the Project for the reporting period. These reviews were conducted to meet the requirements of Condition 5.1 of development Approval 06-009 a) as outlined below:

- 5.1 The Proponent shall develop and implement a **Compliance Tracking Program** to track compliance with the requirements of this approval. The Program shall include, but not necessarily limited to:
- a) provisions for periodic review of the compliance status of the project against the requirements of this approval;
  - c) a program for independent auditing at least annually, or as otherwise agreed by the Director-General, in accordance with IS19011:2002, Guidelines for Quality and/or Environmental Management Systems Auditing;

The details and outcomes of the audits conducted are illustrated below:

### 4.1 NOVEMBER 2011

A review of the compliance status of the NCIG Coal Export Terminal operational activities was initiated by Environmental Auditors from the consulting company MJM Environmental in November 2011. This review specifically focussed on the compliance of the Stage 1 NCIG Coal Export Terminal operations and Stage 2AA construction works against the Development Consent (06\_0009) and meets the requirements of Condition 5.1a).

The outcome of the MJM assessment of the NCIG compliance status is as follows:

*... NCIG was generally in compliance with the relevant conditions of Project Approval 06-009.*

On this basis NCIG continued operations of the Stage 1 NCIG Coal Export Terminal in accordance with the approved management plans, licences and permits and continued the Stage 2AA construction activities.

### 4.2 APRIL 2011 – COMPLIANCE TRACKING

A review of the Compliance Tracking Program document was undertaken in April 2011 to confirm the ongoing compliance of the NCIG project against the requirements of the development consent (06\_0009). This review determined that NCIG met the requirements for all aspects of the consent that were relevant to the stage of the project development as at April 2011. With completion of the review, the Compliance Tracking Program document was revised and submitted to the Department of Planning.

## 5 ACTIVITIES PROPOSED IN NEXT AEMR PERIOD

Significant activity is proposed to be undertaken in the next AEMR period in accordance with the Project Approval and environmental management and monitoring programmes. The principle elements are:

- Continued operation of 30 Mtpa Stage 1 of the NCIG Coal Export Terminal.
- Completion, commissioning and operation of Stage 2AA of the NCIG Coal Export Terminal is scheduled to occur.
- Construction of Stage 2F of the NCIG Coal Export Terminal is scheduled to commence.

ATTACHMENT A  
DUST DEPOSITION MONITORING RESULTS

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	DG1				DG2				DG3				Comments
	IS	Limit	Ash	Com.	IS	Limit	Ash	Com.	IS	Limit	Ash	Com.	
Apr-11	0.4	3.1	0.2	0.2	1.2	3.0	0.4	0.8	5.0	4.0	2.6	2.4	Insects found in DG2 and DG3. Bird Droppings found in DG2.  DG3 Invalid Sample. Excess bird droppings
May-11	0.5	2.4	0.3	0.2	1.5	3.2	0.6	0.9	2.0	4.0	0.8	1.2	
Jun-11	0.8	2.5	0.4	0.4	1.2	3.5	0.4	0.8	2.1	4.0	1.0	1.1	
Jul-11	0.7	2.8	0.4	0.3	1.9	3.2	0.9	1.0	1.4	4.0	0.6	0.8	
Aug-11	0.7	2.7	0.5	0.2	1.4	3.9	0.5	0.9	1.7	3.4	1.2	0.5	
Sep-11	0.9	2.7	0.5	0.4	2.3	3.4	1.0	1.3	NA	NA	NA	NA	
Oct-11	1.8	2.9	0.5	1.3	1.4	4.0	0.7	0.7	1.8	4.0	0.9	0.9	
Nov-11	1.2	3.8	0.7	0.5	1.3	3.4	0.7	0.6	1.1	3.8	0.6	0.5	
Dec-11	0.5	3.2	0.3	0.2	0.7	3.3	0.3	0.4	0.7	3.1	0.1	0.6	
Jan-12	0.5	2.5	0.2	0.3	0.4	2.7	0.1	0.3	0.6	2.7	0.1	0.5	
Feb-12	0.7	2.5	0.3	0.4	0.7	2.4	0.2	0.5	1.8	2.6	0.7	1.1	
Mar-12	0.7	2.7	0.4	0.3	1.7	2.7	0.5	1.2	6.1	3.8	2.4	3.7	

	DG4				DG5				DG6				Comments
	IS	Limit	Ash	Com.	IS	Limit	Ash	Com.	IS	Limit	Ash	Com.	
Apr-11	0.8	3.0	0.4	0.4	1.0	3.3	0.5	0.5	1.3	3.3	0.5	0.8	Insects DG5 and DG6.  Tree litter found in DG5, DG6 Invalid sample: excess bird droppings
May-11	0.6	2.8	0.1	0.5	0.9	3.0	0.4	0.5	1.3	3.3	0.6	0.7	
Jun-11	0.3	3.6	0.1	0.2	1.0	2.9	0.5	0.5	1.6	3.3	0.6	0.9	
Jul-11	0.7	2.3	0.2	0.5	0.9	3.0	0.3	0.6	1.2	3.6	0.6	0.6	
Aug-11	0.7	2.7	0.4	0.3	1.0	2.9	0.5	0.5	1.3	3.2	0.5	0.8	
Sep-11	0.8	2.7	0.2	0.6	1.7	3.0	0.7	0.7	2.2	3.3	1.0	1.2	
Oct-11	1.2	2.8	0.6	0.6	2.2	3.7	1.1	1.1	2.6	4.0	1.2	1.4	
Nov-11	1.0	3.2	0.3	0.7	2.1	4.0	1.1	1.0	9.7	4.0	3.3	6.4	
Dec-11	1.2	3.0	0.2	1.0	2.5	4.0	0.8	1.7	0.8	4.0	0.2	0.6	
Jan-12	0.5	3.2	0.1	0.4	2.0	4.0	0.7	1.3	0.6	2.8	0.1	0.5	
Feb-12	1.1	2.5	0.2	0.9	1.0	4.0	0.4	0.6	2.4	2.6	0.5	1.9	
Mar-12	2.0	3.1	0.5	1.5	1.2	3.0	0.6	0.6	2.7	4.0	1.0	1.7	

ATTACHMENT B  
SURFACE WATER MONITORING RESULTS

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**Temperature (°C)**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	23.4	20.5	21.6
May-11	16.7	16.6	16.2
Jun-11	14.6	18.8	22.2
Jul-11	17.8	14.0	9.2
Aug-11	20.5	22.4	23.0
Sep-11	24.5	25.8	faulty
Oct-11	faulty	faulty	faulty
Nov-11	faulty	32.0	22.1
Dec-11	25.2	23.1	26.1
Jan-12	23.2	23.7	12.7
Feb-12	28.5	25.6	30.0
Mar-12	24.9	25.9	26.1

**pH**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	8.59	8.16	8.33
May-11	8.00	7.86	8.44
Jun-11	8.35	7.97	8.32
Jul-11	8.01	7.24	7.33
Aug-11	8.29	7.69	7.53
Sep-11	8.11	7.36	7.82
Oct-11	8.34	7.52	9.10
Nov-11	8.15	8.66	7.44
Dec-11	8.23	7.94	7.94
Jan-12	8.11	8.12	7.78
Feb-12	8.55	8.19	8.15
Mar-12	8.61	7.24	9.23

**Electrical Conductivity (mS/cm)**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	6.68	12.21	3.35
May-11	9.51	24.90	1.82
Jun-11	14.85	24.00	0.95
Jul-11	3.20	4.91	0.59
Aug-11	8.62	4.50	0.89
Sep-11	7.61	faulty	0.94
Oct-11	7.09	faulty	1.73
Nov-11	2.28	3.21	0.63
Dec-11	4.34	5.13	1.14
Jan-12	3.97	4.66	0.53
Feb-12	2.16	2.79	0.78
Mar-12	2.57	3.39	0.67

**Turbidity (NTU)**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	6.0	8.7	17.4
May-11	21.9	65.2	24.0
Jun-11	59.6	48.6	36.6
Jul-11	97.9	98.9	212
Aug-11	12.8	11.1	83.5
Sep-11	7.5	faulty	38.9
Oct-11	53.2	faulty	15.1
Nov-11	26.8	35.9	17.0
Dec-11	42.7	65.3	59.5
Jan-12	faulty	faulty	faulty
Feb-12	faulty	faulty	faulty
Mar-12	35.0	42.0	38.0

**Dissolved Oxygen (mg/L)**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	0.83	0.50	0.57
May-11	4.48	3.68	4.49
Jun-11	1.63	3.42	2.86
Jul-11	4.12	3.30	3.62
Aug-11	2.21	2.48	1.57
Sep-11	2.05	faulty	2.80
Oct-11	faulty	faulty	faulty
Nov-11	faulty	faulty	faulty
Dec-11	7.06	10.50	6.20
Jan-12	7.40	6.64	6.48
Feb-12	faulty	faulty	faulty
Mar-12	faulty	faulty	2.93

**Redox (mV)**

	Pond 2	Deep Pond	Black Swan Pond
Apr-11	43	-216	145
May-11	92	-42	42
Jun-11	55	6	63
Jul-11	157	81	-40
Aug-11	79	79	-296
Sep-11	148	faulty	51
Oct-11	faulty	faulty	faulty
Nov-11	126	42	183
Dec-11	152	55	105
Jan-12	33	78	167
Feb-12	73	58	114
Mar-12	82	15	104

ATTACHMENT C  
GROUNDWATER MONITORING RESULTS

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	GW1	GW1	GW1
Date	11/04/2011	9/05/2011	8/06/2011
Water Level (m)	2.25	1.39	1.59
pH	7.53	7.58	7.73
Elec Cond $\mu$ S/cm	11800	12100	10600
TDS (mg/L)	6560	5410	6110
Suspended Solids (mg/L)	10	8	40
Sulfate (mg/L)	516	568	623
Magnesium (mg/L)	99	98	111
Sodium (mg/L)	1900	1840	1930
Potassium (mg/L)	118	114	125
Aluminium (mg/L)	<0.01	<0.01	<0.01
Arsenic (mg/L)	<0.001	<0.001	<0.001
Cadmium (mg/L)	0.0001	<0.0001	0.0002
Cobalt (mg/L)	<0.001	<0.001	<0.001
Copper (mg/L)	0.002	0.004	0.004
Lead (mg/L)	<0.001	<0.001	<0.001
Manganese (mg/L)	0.124	0.103	0.008
Nickel (mg/L)	0.002	<0.001	<0.001
Zinc (mg/L)	0.022	0.009	0.029
Iron (mg/L)	<0.05	<0.05	<0.05
Mercury (mg/L)	<0.0001	<0.0001	<0.0001
Hexavalent Chromium (mg/L)	<0.02	<0.01	<0.01
Naphthalene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthylene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluorene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Phenanthrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benz(a)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Chrysene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(b)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(k)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(a)pyrene ( $\mu$ g/L)	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene ( $\mu$ g/L)	<1.0	<1.0	<1.0

	GW2	GW2	GW2
Date	11/04/2011	9/05/2011	8/06/2011
Water Level (m)	4.3	3.49	3.58
pH	7.36	7.2	7.2
Elec Cond $\mu$ S/cm	1120	2490	1560
TDS (mg/L)	652	1410	902
Suspended Solids (mg/L)	54	124	184
Sulfate (mg/L)	87	267	130
Magnesium (mg/L)	7	14	9
Sodium (mg/L)	120	338	211
Potassium (mg/L)	11	22	16
Aluminium (mg/L)	<0.01	0.02	0.03
Arsenic (mg/L)	<0.001	<0.001	0.004
Cadmium (mg/L)	<0.0001	<0.0001	<0.0001
Cobalt (mg/L)	<0.001	<0.001	<0.001
Copper (mg/L)	<0.001	0.003	<0.001
Lead (mg/L)	<0.001	<0.001	<0.001
Manganese (mg/L)	0.302	0.518	0.361
Nickel (mg/L)	<0.001	0.002	<0.001
Zinc (mg/L)	0.014	0.027	0.019
Iron (mg/L)	3.31	5.85	2.96
Mercury (mg/L)	<0.0001	<0.0001	<0.0001
Hexavalent Chromium (mg/L)	<0.02	<0.01	<0.01
Naphthalene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthylene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluorene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Phenanthrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benz(a)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Chrysene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(b)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(k)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(a)pyrene ( $\mu$ g/L)	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene ( $\mu$ g/L)	<1.0	<1.0	<1.0

	GW3	GW3	GW3
Date	11/04/2011	9/05/2011	8/06/2011
Water Level (m)	4.3	3.59	3.72
pH	7.52	7.64	7.56
Elec Cond $\mu$ S/cm	878	836	741
TDS (mg/L)	536	456	470
Suspended Solids (mg/L)	72	145	188
Sulfate (mg/L)	64	68	46
Magnesium (mg/L)	8	9	11
Sodium (mg/L)	104	78	60
Potassium (mg/L)	7	8	8
Aluminium (mg/L)	0.01	0.01	0.05
Arsenic (mg/L)	0.006	0.005	0.005
Cadmium (mg/L)	<0.0001	0.0001	<0.0001
Cobalt (mg/L)	<0.001	<0.001	0.002
Copper (mg/L)	0.002	0.002	0.002
Lead (mg/L)	<0.001	<0.001	<0.001
Manganese (mg/L)	0.022	0.035	0.105
Nickel (mg/L)	0.002	0.003	0.002
Zinc (mg/L)	0.013	0.011	0.009
Iron (mg/L)	<0.05	<0.05	<0.05
Mercury (mg/L)	<0.0001	<0.0001	<0.0001
Hexavalent Chromium (mg/L)	<0.01	<0.01	<0.01
Naphthalene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthylene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluorene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Phenanthrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benz(a)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Chrysene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(b)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(k)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(a)pyrene ( $\mu$ g/L)	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene ( $\mu$ g/L)	<1.0	<1.0	<1.0

	GW3	GW3	GW3
Date	11/04/2011	9/05/2011	8/06/2011
Water Level (m)	4.3	3.59	3.72
pH	7.52	7.64	7.56
Elec Cond $\mu$ S/cm	878	836	741
TDS (mg/L)	536	456	470
Suspended Solids (mg/L)	72	145	188
Sulfate (mg/L)	64	68	46
Magnesium (mg/L)	8	9	11
Sodium (mg/L)	104	78	60
Potassium (mg/L)	7	8	8
Aluminium (mg/L)	0.01	0.01	0.05
Arsenic (mg/L)	0.006	0.005	0.005
Cadmium (mg/L)	<0.0001	0.0001	<0.0001
Cobalt (mg/L)	<0.001	<0.001	0.002
Copper (mg/L)	0.002	0.002	0.002
Lead (mg/L)	<0.001	<0.001	<0.001
Manganese (mg/L)	0.022	0.035	0.105
Nickel (mg/L)	0.002	0.003	0.002
Zinc (mg/L)	0.013	0.011	0.009
Iron (mg/L)	<0.05	<0.05	<0.05
Mercury (mg/L)	<0.0001	<0.0001	<0.0001
Hexavalent Chromium (mg/L)	<0.01	<0.01	<0.01
Naphthalene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthylene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluorene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Phenanthrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benz(a)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Chrysene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(b)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(k)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(a)pyrene ( $\mu$ g/L)	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene ( $\mu$ g/L)	<1.0	<1.0	<1.0

	GW4	GW4	GW4
Date	11/04/2011	9/05/2011	8/06/2011
Water Level (m)	4.25	3.45	3.55
pH	6.95	7.1	7.28
Elec Cond $\mu$ S/cm	17500	17700	15900
TDS (mg/L)	9800	9030	10200
Suspended Solids (mg/L)	126	191	200
Sulfate (mg/L)	359	560	466
Magnesium (mg/L)	272	292	322
Sodium (mg/L)	2840	2920	2880
Potassium (mg/L)	110	116	114
Aluminium (mg/L)	0.03	0.18	0.11
Arsenic (mg/L)	0.003	0.002	<0.001
Cadmium (mg/L)	<0.0001	<0.0001	<0.0001
Cobalt (mg/L)	0.001	0.001	0.001
Copper (mg/L)	0.001	0.002	0.002
Lead (mg/L)	0.002	<0.001	<0.001
Manganese (mg/L)	1.13	1.04	1.3
Nickel (mg/L)	0.002	<0.001	0.001
Zinc (mg/L)	0.01	0.006	0.012
Iron (mg/L)	<0.05	<0.05	<0.05
Mercury (mg/L)	<0.0001	<0.0001	<0.0001
Hexavalent Chromium (mg/L)	<0.01	<0.01	<0.01
Naphthalene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthylene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Acenaphthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluorene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Phenanthrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benz(a)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Chrysene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(b)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(k)fluoranthene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(a)pyrene ( $\mu$ g/L)	<0.6	<0.5	<0.5
Indeno(1.2.3.cd)pyrene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Dibenz(a,h)anthracene ( $\mu$ g/L)	<1.0	<1.0	<1.0
Benzo(g,h,i)perylene ( $\mu$ g/L)	<1.0	<1.0	<1.0

RCAL-E = RCA Laboratories -  
Environmental  
External = External Testing Laboratory

	Reporting Units	Required by EPA	Testing Laboratory Used	Bore GW1	Sampling on 1 July 2011	Sampling on 2 December 2011
EPA Point Number				1		
Sample Number					07116902001GW1	12116902001
Date of Sampling					1/07/2011	2/12/2011
Time of Sampling					11:20	11:15
Sampler					Chad South	K. Hawes
Groundwater Level	metres		RCAL-E	Y	2.15	1.43
Temperature	°C		RCAL-E	Y	19	20
<b>Analyte</b>						
pH	pH units	Y	RCAL-E	Y	7.4	7.7
EC	µS/cm	Y	RCAL-E	Y	9240	9810
TDS	mg/L	N	RCAL-E	Y	6348	6559
TSS	mg/L	N	RCAL-E	Y	21	26
<b>Metals - Dissolved</b>						
Al	mg/L	Y	External	Y	<0.01	<0.01
Cd	mg/L	N	External	Y	0.0086	0.0022
Co	mg/L	Y	External	Y	<0.001	<0.001
Cu	mg/L	Y	External	Y	0.004	0.003
Pb	mg/L	N	External	Y	0.004	<0.001
Mn	mg/L	Y	External	Y	0.032	0.176
Ni	mg/L	Y	External	Y	0.002	0.001
Zn	mg/L	Y	External	Y	0.019	0.015
Fe	mg/L	Y	External	Y	<0.05	<0.05
Hg	mg/L	N	External	Y	<0.0001	0.0002
As III	µg/L	N	External	Y	<1	<1
Hexavalent Cr	mg/L	N	External	Y	<0.010	<0.010
<b>Cations - Dissolved</b>						
Mg	mg/L	Y	External	Y	101	104
Na	mg/L	Y	External	Y	1930	2040
K	mg/L	Y	External	Y	122	127
<b>PAH</b>						
Polynuclear Aromatic Hydrocarbons - 16 analytes	µg/L	Y (Only Total)	External	Y	<0.5	<0.5
<b>BTEX</b>						
Benzene	µg/L	Y	External	Y	<1	<1
Toluene	µg/L	Y	External	Y	<5	<5
Ethyl Benzene	µg/L	Y	External	Y	<2	<2
m+p Xylene	µg/L	Y	External	Y	<2	<2
o Xylene	µg/L	Y	External	Y	<2	<2
<b>TPH</b>						
C6-9 Fraction	µg/L	Y	External	Y	<20	<20
C10-14 Fraction	µg/L	Y	External	Y	<50	<50
C15-28 Fraction	µg/L	Y	External	Y	<100	<100
C29-36 Fraction	µg/L	Y	External	Y	<50	<50
<b>Cyanide</b>						
Free	µg/L	Y	External	Y	<4	<4
Total	µg/L	Y	External	Y	<4	<4
Phenol	µg/L	Y	External	Y	<1	<1
Sulfate	mg/L	N	External	Y	500	698
Ammonia	µg/L	Y	External	Y	100	<100

RCAL-E = RCA Laboratories -  
Environmental  
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Cells with a green shade indicate that the trigger level associated with this result has not been exceeded

Cells with a yellow shade indicate that the result is less than a value which could contain the trigger value

Cells with a red shade indicate that the trigger level associated with this result has been exceeded

Reporting Units	Required by EPA	Testing Laboratory Used	Bore K9/3 N			Sampling on 1 July 2011	Sampling on 2 December 2011
			EP Licence Trigger Level				
EPA Point Number			20				
Sample Number					07116902002K9/3N	12116902002	
Date of Sampling					1/07/2011	2/12/2011	
Time of Sampling					10:35	10:45	
Sampler					Chad South	K. Hawes	
Groundwater Level	metres	RCAL-E	Y		2.91	2.75	
Temperature	°C	RCAL-E	Y		18.5	20	
<b>Analyte</b>							
pH	pH units	Y	RCAL-E	Y	7.1	7.2	
EC	µS/cm	Y	RCAL-E	Y	19000	19620	
TDS	mg/L	N	RCAL-E	Y	15417	14974	
TSS	mg/L	N	RCAL-E	Y	20	12	
<b>Metals - Dissolved</b>							
Al	mg/L	Y	External	Y	<0.01	<0.01	
Cd	mg/L	N	External	Y	0.0014	0.0015	
Co	mg/L	Y	External	Y	<0.001	<0.001	
Cu	mg/L	Y	External	Y	0.008	0.004	
Pb	mg/L	N	External	Y	<0.001	<0.001	
Mn	mg/L	Y	External	Y	0.014	1.47	
Ni	mg/L	Y	External	Y	0.003	0.002	
Zn	mg/L	Y	External	Y	0.029	0.023	
Fe	mg/L	Y	External	Y	<0.05	<0.05	
Hg	mg/L	N	External	Y	<0.0001	<0.0001	
As III	µg/L	N	External	Y	<1	<2	
Hexavalent Cr	mg/L	N	External	Y	<0.010	<0.010	
<b>Cations - Dissolved</b>							
Mg	mg/L	Y	External	Y	476	417	
Na	mg/L	Y	External	Y	5400	3910	
K	mg/L	Y	External	Y	202	203	
<b>PAH</b>							
Polynuclear Aromatic Hydrocarbons - 16 analytes	µg/L	Y (Only Total)	External	Y	1	<0.5	<0.5
<b>BTEX</b>							
Benzene	µg/L	Y	External	Y	700	<1	<1
Toluene	µg/L	Y	External	Y	180	<5	<5
Ethyl Benzene	µg/L	Y	External	Y	5	<2	<2
m+p Xylene	µg/L	Y	External	Y	75	<2	<2
o Xylene	µg/L	Y	External	Y	350	<2	<2
<b>TPH</b>							
C6-9 Fraction	µg/L	Y	External	Y	20	<20	<20
C10-14 Fraction	µg/L	Y	External	Y	50	<50	<50
C15-28 Fraction	µg/L	Y	External	Y	100	<100	<100
C29-36 Fraction	µg/L	Y	External	Y	50	<50	<50
<b>Cyanide</b>							
Free	µg/L	Y	External	Y	4	<4	<4
Total	µg/L	Y	External	Y	81.1	<4	<4
Phenol	µg/L	Y	External	Y	400	<1	<1
Sulfate	mg/L	N	External	Y		1690	2310
Ammonia	µg/L	Y	External	Y		100	1090

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EPA Point Number	Reporting Units	Required by EPA	Testing Laboratory Used	Bore K9/3 S		Sampling on 1 July 2011	Sampling on 2 December 2011
				EP Licence Trigger Level			
EPA Point Number				21			
Sample Number						07116902003K9/3S	12116902003
Date of Sampling						1/07/2011	2/12/2011
Time of Sampling						10:40	10:30
Sampler						Chad South	K. Hawes
Groundwater Level	metres		RCAL-E	Y		2.02	1.99
Temperature	°C		RCAL-E	Y		18	21
<b>Analyte</b>							
pH	pH units	Y	RCAL-E	Y		7.4	7.6
EC	µS/cm	Y	RCAL-E	Y		9940	10010
TDS	mg/L	N	RCAL-E	Y		6791	6790
TSS	mg/L	N	RCAL-E	Y		698	1240
<b>Metals - Dissolved</b>							
Al	mg/L	Y	External	Y		<0.01	0.08
Cd	mg/L	N	External	Y		0.0004	0.0043
Co	mg/L	Y	External	Y		0.001	<0.001
Cu	mg/L	Y	External	Y		0.003	0.003
Pb	mg/L	N	External	Y		<0.001	<0.001
Mn	mg/L	Y	External	Y		0.358	0.348
Ni	mg/L	Y	External	Y		0.002	0.002
Zn	mg/L	Y	External	Y		<0.005	0.063
Fe	mg/L	Y	External	Y		<0.05	<0.05
Hg	mg/L	N	External	Y		<0.0001	<0.0001
As III	µg/L	N	External	Y		<1	<1
Hexavalent Cr	mg/L	N	External	Y		<0.010	0.01
<b>Cations - Dissolved</b>							
Mg	mg/L	Y	External	Y		151	171
Na	mg/L	Y	External	Y		1910	2040
K	mg/L	Y	External	Y		83	118
<b>PAH</b>							
Polynuclear Aromatic Hydrocarbons - 16 analytes	µg/L	Y (Only Total)	External	Y	1.1	<0.5	<0.5
<b>BTEX</b>							
Benzene	µg/L	Y	External	Y	700	<1	<1
Toluene	µg/L	Y	External	Y	180	<5	<5
Ethyl Benzene	µg/L	Y	External	Y	5	<2	<2
m+p Xylene	µg/L	Y	External	Y	75	<2	<2
o Xylene	µg/L	Y	External	Y	350	<2	<2
<b>TPH</b>							
C6-9 Fraction	µg/L	Y	External	Y	20	<20	<20
C10-14 Fraction	µg/L	Y	External	Y	50	<50	<50
C15-28 Fraction	µg/L	Y	External	Y	100	<100	<100
C29-36 Fraction	µg/L	Y	External	Y	50	<50	<50
<b>Cyanide</b>							
Free	µg/L	Y	External	Y	4	<4	<4
Total	µg/L	Y	External	Y	21.8	5	<4
Phenol	µg/L	Y	External	Y	400	<1	<1
Sulfate	mg/L	N	External	Y		699	886
Ammonia	µg/L	Y	External	Y		100	<100

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	Reporting Units	Required by EPA	Testing Laboratory Used	Bore K11/1 EP Licence Trigger Level	Sampling on 1 July 2011	Sampling on 2 December 2011	
EPA Point Number				22			
Sample Number					07116902004K11/1	12116902004	
Date of Sampling					1/07/2011	2/12/2011	
Time of Sampling					11:58	10:15	
Sampler					Chad South	K. Hawes	
Groundwater Level	metres		RCAL-E	Y	1.5	1.66	
Temperature	°C		RCAL-E	Y	19	18	
<b>Analyte</b>							
pH	pH units	Y	RCAL-E	Y	7.2	7.2	
EC	µS/cm	Y	RCAL-E	Y	3310	914	
TDS	mg/L	N	RCAL-E	Y	2239	528	
TSS	mg/L	N	RCAL-E	Y	121	180	
<b>Metals - Dissolved</b>							
Al	mg/L	Y	External	Y	<0.01	<0.01	
Cd	mg/L	N	External	Y	<0.0001	0.0002	
Co	mg/L	Y	External	Y	<0.001	0.002	
Cu	mg/L	Y	External	Y	<0.001	<0.001	
Pb	mg/L	N	External	Y	<0.001	<0.001	
Mn	mg/L	Y	External	Y	0.746	1.04	
Ni	mg/L	Y	External	Y	<0.001	0.001	
Zn	mg/L	Y	External	Y	0.018	0.007	
Fe	mg/L	Y	External	Y	<0.05	1.38	
Hg	mg/L	N	External	Y	<0.0001	<0.0001	
As III	µg/L	N	External	Y	<1	1	
Hexavalent Cr	mg/L	N	External	Y	<0.010	<0.010	
<b>Cations - Dissolved</b>							
Mg	mg/L	Y	External	Y	23	10	
Na	mg/L	Y	External	Y	516	86	
K	mg/L	Y	External	Y	13	7	
<b>PAH</b>							
Polynuclear Aromatic Hydrocarbons - 16 analytes	µg/L	Y (Only Total)	External	Y	2.2	<0.5	<0.5
<b>BTEX</b>							
Benzene	µg/L	Y	External	Y	700	<1	<1
Toluene	µg/L	Y	External	Y	180	<5	<5
Ethyl Benzene	µg/L	Y	External	Y	5	<2	<2
m+p Xylene	µg/L	Y	External	Y	75	<2	<2
o Xylene	µg/L	Y	External	Y	350	<2	<2
<b>TPH</b>							
C6-9 Fraction	µg/L	Y	External	Y	20	<20	<20
C10-14 Fraction	µg/L	Y	External	Y	50	<50	<50
C15-28 Fraction	µg/L	Y	External	Y	100	<100	<100
C29-36 Fraction	µg/L	Y	External	Y	50	<50	<50
<b>Cyanide</b>							
Free	µg/L	Y	External	Y	4	<4	<4
Total	µg/L	Y	External	Y	16.6	<4	<4
Phenol	µg/L	Y	External	Y	400	<1	<1
Sulfate	mg/L	N	External	Y	112	49	49
Ammonia	µg/L	Y	External	Y	680	680	310

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Cells with a red shade indicate that the trigger level associated with this result has been exceeded

	Reporting Units	Required by EPA	Testing Laboratory Used	Bore K11/1 S	EP Licence Trigger Level	Sampling on 1 July 2011	Sampling on 2 December 2011
EPA Point Number				23			
Sample Number						07116902005K11/1S	12116902005
Date of Sampling						1/07/2011	2/12/2011
Time of Sampling						12:10	9:45
Sampler						Chad South	K. Hawes
Groundwater Level	metres		RCAL-E	Y		2.64	2.52
Temperature	°C		RCAL-E	Y		19	19
<b>Analyte</b>							
pH	pH units	Y	RCAL-E	Y		7.3	7.6
EC	µS/cm	Y	RCAL-E	Y		18240	17930
TDS	mg/L	N	RCAL-E	Y		14544	12373
TSS	mg/L	N	RCAL-E	Y		83	14
<b>Metals - Dissolved</b>							
Al	mg/L	Y	External	Y		<0.01	<0.01
Cd	mg/L	N	External	Y		<0.0001	0.0001
Co	mg/L	Y	External	Y		<0.001	<0.001
Cu	mg/L	Y	External	Y		0.002	0.002
Pb	mg/L	N	External	Y		<0.001	<0.001
Mn	mg/L	Y	External	Y		0.627	0.416
Ni	mg/L	Y	External	Y		<0.001	0.002
Zn	mg/L	Y	External	Y		<0.005	0.007
Fe	mg/L	Y	External	Y		<0.05	<0.05
Hg	mg/L	N	External	Y		<0.0001	<0.0001
As III	µg/L	N	External	Y		<1	<2
Hexavalent Cr	mg/L	N	External	Y		<0.010	<0.010
<b>Cations - Dissolved</b>							
Mg	mg/L	Y	External	Y		376	311
Na	mg/L	Y	External	Y		3910	4400
K	mg/L	Y	External	Y		184	186
<b>PAH</b>							
Polyuclear Aromatic Hydrocarbons - 16 analytes	µg/L	Y (Only Total)	External	Y	1.5	<0.5	<0.5
<b>BTEX</b>							
Benzene	µg/L	Y	External	Y	700	<1	<1
Toluene	µg/L	Y	External	Y	180	<5	<5
Ethyl Benzene	µg/L	Y	External	Y	5	<2	<2
m+p Xylene	µg/L	Y	External	Y	75	<2	<2
o Xylene	µg/L	Y	External	Y	350	<2	<2
<b>TPH</b>							
C6-9 Fraction	µg/L	Y	External	Y	20	<20	<20
C10-14 Fraction	µg/L	Y	External	Y	50	<50	<50
C15-28 Fraction	µg/L	Y	External	Y	100	<100	<100
C29-36 Fraction	µg/L	Y	External	Y	50	<50	<50
<b>Cyanide</b>							
Free	µg/L	Y	External	Y	4	<4	<4
Total	µg/L	Y	External	Y	75.6	<4	<4
Phenol	µg/L	Y	External	Y	400	<1	<1
Sulfate	mg/L	N	External	Y		809	786
Ammonia	µg/L	Y	External	Y		4950	<100