

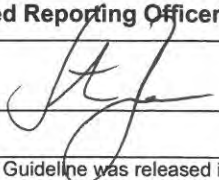
NARRABRI MINE

2015-2016 ANNUAL REVIEW



WHITEHAVEN COAL

Table 1: Annual Review Title Block

Name of Operation	Narrabri Mine
Name of Operator	Narrabri Coal Operations Pty Ltd
Development consent / Project Approval #	Project Approval 08_0144
Name of holder of development consent/project approval	Narrabri Coal Operations Pty Ltd
Mining lease #	ML 1609
Name of holder of mining lease	Narrabri Coal Pty Ltd
Water Licence #	Refer to Water Licences in Table 1
Name of holder of water licence	Narrabri Coal Pty Ltd, Daewoo International Narrabri Investment Pty Ltd, EDF Trading Australia Pty Ltd, J-Power Australia Pty Ltd, Kores Narrabri Pty Ltd and Upper Horn Investments (Australia) Pty Ltd
MOP/RMP start date¹	11 August 2011
MOP/RMP end date	31 December 2017
Annual Review Commencement Date	1 April 2015
Annual Review Completion Date	31 March 2016
I, Steve Bow, certify that this audit report is a true and accurate record of the compliance status of the Narrabri Mine for the period 1st April 2015 to 31st March 2016, and that I am authorised to make this statement on behalf of Narrabri Coal Operations Pty Ltd. Note. a) The Annual Review is an 'environmental audit' for the purposes of section 122B (2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000. b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or \$22,000, or both).	
Name of Authorised Reporting Officer	Steve Bow
Title of Authorised Reporting Officer	General Manager – Narrabri Mine
Signature	
Date	30 / 6 / 16.

¹NSW Annual Review Guideline was released in October 2015

TABLE OF CONTENTS

1	STATEMENT OF COMPLIANCE.....	1
2	INTRODUCTION	6
2.1	PROJECT BACKGROUND	6
2.2	PROJECT DESCRIPTION	6
2.3	MINE CONTACTS	7
3	APPROVALS	9
4	OPERATIONS SUMMARY	11
4.1	EXPLORATION ACTIVITIES.....	11
4.2	CONSTRUCTION.....	11
4.3	MINING OPERATIONS	11
4.4	OTHER OPERATIONS.....	12
4.5	NEXT REPORTING PERIOD	12
5	ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW	13
6	ENVIRONMENTAL PERFORMANCE	15
6.1	NOISE.....	17
6.2	BLAST.....	18
6.3	AIR QUALITY	19
6.4	GREENHOUSE GAS.....	22
6.5	BIODIVERSITY.....	23
6.6	ABORIGINAL CULTURAL HERITAGE	30
6.7	HISTORIC HERITAGE	31
6.8	TRANSPORT.....	31
6.9	WASTE MANAGEMENT	32
6.10	HAZARDOUS MATERIALS.....	33
6.11	VISUAL & LIGHTING.....	33
6.12	BUSHFIRE.....	34
6.13	MINE SUBSIDENCE	34
6.14	PUBLIC SAFETY	36
7	WATER MANAGEMENT	38
7.1	WATER SUPPLY.....	38

7.2	SURFACE WATER MANAGEMENT	38
7.3	GROUNDWATER	40
7.4	SITE WATER BALANCE	42
8	REHABILITATION	44
8.1	REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD	44
9	COMMUNITY	46
9.1	COMMUNITY ENGAGEMENT ACTIVITIES	46
9.2	COMMUNITY CONTRIBUTIONS & INITIATIVES.....	46
9.3	COMMUNITY COMPLAINTS	46
10	INDEPENDENT AUDIT	48
10.1	INDEPENDENT ENVIRONMENTAL AUDIT	48
11	INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD	49
11.1	NON-COMPLIANCES	49
11.2	REPORTABLE INCIDENTS OR EXCEEDANCES	50
11.3	REGULATORY ACTIONS	50
12	ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD	51

LIST OF TABLES

Table 1: Annual Review Title Block	i
Table 2: Statement of Compliance.....	1
Table 3: Compliance Status Key.....	2
Table 4: Non-Compliances.....	3
Table 5: Licences, Leases and Approvals	9
Table 6: Production Summary	11
Table 7: Hours of Operation.....	12
Table 8: Actions from the Previous Annual Review (2014-2015)	13
Table 9: SPL Measurements.....	18
Table 10: Deposited Dust Monitoring Data Summary for the Reporting Period	19
Table 11: Summary of Meteorological Conditions	21
Table 12: Biodiversity Management Plan 2015 Monitoring Results	24
Table 13: Land Management Plan 2015 Monitoring Results.....	25
Table 14: Comparative Fauna Species Richness, Kenna BOA.....	27
Table 15: Comparative Fauna Species Richness, Onsite BOA.....	28
Table 16: Subsidence Parameters – Predicted and Measured	36
Table 17: Narrabri Mine Water Take.....	38
Table 18: Groundwater Monitoring Summary	40

Table 19: Stored Water	42
Table 20: Rehabilitation Status	44
Table 21: Summary of Community Complaints and Enquiries	46
Table 22: 2013 Independent Audit – Outstanding Actions	48
Table 23: Non-Compliance Details and Proposed Action Plan	49

LIST OF FIGURES

Figure 1: Project Locality Plan	8
Figure 2: Current Environmental Monitoring Locations	16
Figure 3: ND9 PM ₁₀ Results	20
Figure 4: ND10 PM ₁₀ Results	21
Figure 5: Water Management System Schematic	43

PLANS

Plan 3

Plan 4

Plan 5

LIST OF APPENDICES

Appendix A – *Flora Species List*

Appendix B – *Photo Monitoring Records*

Appendix C – *Fauna Species List*

Appendix D – *Surface Water Data*

Appendix E – *Groundwater Data*

1 STATEMENT OF COMPLIANCE

This Annual Review has been prepared to provide a summary of the environmental performance of the Narrabri Mine over the reporting period, i.e. 1 April 2015 to 31 March 2016. The compliance status of the mine against relevant approvals was assessed as at the end of the reporting period and is summarised in **Table 2**. References to the mine's Environment Protection Licence (EPL) 12789 are limited to those that relate to the Project Approval, specifically: Schedule 4, Conditions 10 and 11 and Schedule 6, Condition 7(c).

Table 2: Statement of Compliance

Where all the conditions of the relevant approvals complied with?	Yes/No
Project Approval (PA) 08_0144	No
Mining Operations Plan (MOP)	Yes
Mining Lease (ML) 1609	Yes
Environment Protection Licence (EPL) 12789	Yes
Exploration Licence (EL) 6243	Yes
Subsidence Management Plan (SMP) Approval 10/9000	Yes
90CA811347	Yes
90WA812891	Yes
90CA802130	Yes
90WA822539	No
WAL15922	Yes
WAL12833	Yes
WAL20131	Yes
WAL6762	Yes
WAL2671	Yes
WAL2728	Yes
WAL20152	Yes
WAL29549	Yes
Groundwater Monitoring Bores: 90BL254481-487, 90BL254658-663, 90BL254701, 90BL254958-967, 90BL255167-173, 90BL255216-218, 90BL255769-772, 90BL256060-064, 90BL256344 and 90BL256346	Yes

Any non-compliance during the reporting period are ranked according to the compliance status key in **Table 3** and are detailed in **Table 4**. **Section 11** provides further details of any non-compliance and actions undertaken or proposed for the following reporting period to prevent re-occurrence and mitigate any potential adverse effects.

Table 3: Compliance Status Key

Risk Level	Colour Code	Description
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with: - potential for serious environmental consequences, but is unlikely to occur; or - potential for moderate environmental consequences, but is likely to occur
Low	Non-Compliant	Non-compliance with: - potential for moderate environmental consequences, but is unlikely to occur; or - potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-Compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)

Table 4: Non-Compliances

Relevant Approval	Cond. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
PA 08_0144	Schedule 2, Condition 2	The Proponent shall carry out the project generally in accordance	Non-compliant	Refer following	Throughout AR
	Schedule 3, Condition 4	Extraction Plan – Water Management Plan (EP-WMP) - which has been prepared in consultation with EPA and DPI Water, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on surface water resources, groundwater resources and flooding, and which includes...	Non-compliant	The EP-WMP requires an annual review of groundwater data to be completed by an experienced hydrogeologist, which has not occurred. However, groundwater reviews have been undertaken during the reporting period but not for the full period.	Sections 7.3 & 11
	Schedule 3, Condition 4	Extraction Plan – Biodiversity Management Plan (EP-BMP) – which has been prepared in consultation with OEH and DRE, which provides for the management of the potential impacts and/or environmental consequences of the proposed second workings on flora and fauna	Non-Compliant	An increase of 10% or more in weed cover was recorded in 3 monitoring plots	Section 6.5.2 & 11
	Schedule 4, Condition 1	The Proponent shall ensure that the noise generated by the project does not exceed the noise criteria in Table 1.	Non-compliant	Noise exceedances were recorded during the reporting period. The relevant Government agencies were notified at the time as required by the NMP.	Sections 6.1 & 11
	Schedule 4, Condition 13	Prior to 30 June 2011, the Proponent shall revise the Water Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with water management (Stages 1 and 2) and subsequently implement this revised version of the Water Management Plan to the satisfaction of the Secretary. This revised plan must be produced in consultation with EPA and DPI Water by suitably qualified expert/s whose appointment/s have been approved by the Secretary and include a:...Site Water Balance	Non-compliant	Levels in the rail loop water storages will be monitored on a weekly basis and following a storm event with the results recorded on the monitoring database (SoC 7.13). While some dams were monitored continuously, others are monitored monthly and not all are done on a weekly basis.	Section 11
	Schedule 4, Condition 13	Prior to 30 June 2011, the Proponent shall revise the Water Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with water management (Stages 1 and 2) and subsequently implement this revised version	Non-compliant	Monitoring data is now available on the website but it was not available during the reporting period. The raw monitoring data is published on the mine's website within two weeks of sampling.	Sections 7.3 & 11

Relevant Approval	Cond. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
		of the Water Management Plan to the satisfaction of the Secretary. This revised plan must be produced in consultation with EPA and DPI Water by suitably qualified expert/s whose appointment/s have been approved by the Secretary and include a:.....Groundwater Monitoring Plan			
	Schedule 4, Condition 13	Prior to 30 June 2011, the Proponent shall revise the Water Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with water management (Stages 1 and 2) and subsequently implement this revised version of the Water Management Plan to the satisfaction of the Secretary. This revised plan must be produced in consultation with EPA and DPI Water by suitably qualified expert/s whose appointment/s have been approved by the Secretary and include a:.....Groundwater Monitoring Plan	Non-compliant	The WMP requires an annual review of groundwater data to be completed by an experienced hydrogeologist, which has not occurred. However, groundwater reviews have been undertaken during the reporting period but not for the full period.	Sections 7.3 & 11
	Schedule 5, Condition 4	LMP – a detailed description of how the performance of the rehabilitation works would be monitored over time to achieve the stated objectives and against the relevant performance and completion criteria; and	Non-compliant	LMP states: “The Wild Dog is the only feral animal species that requires control across the site. The number of baits placed, the number of baits taken and any dead animals observed will be recorded. This will be undertaken for each baiting period as recommended by the local LHPA officer. This will be undertaken for the duration of the mining lease.” While feral animal control has occurred, wild dogs were not included as the most prolific feral animal onsite is the feral pig.	Sections 6.5 & 11
	Schedule 5, Condition 6	Biodiversity Offset Strategy (BOS) – provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by OEH) adjoining Mt Kaputar National Park to confirm the ability of either of these property/ies to meet “like for like or better” and “maintain or improve” conservation outcomes;	Non-compliant	The BOS requires a Vertebrate Pest Management Program (VPMP) to be developed. While feral animal control has been undertaken a formal VPMP has not been developed in consultation with surrounding landholders.	Sections 6.5 & 11
	Schedule 5, Condition 6	BOS - provide a detailed assessment of offset proposal/s involving the property/ies (agreed to by OEH) adjoining Mt Kaputar National Park to confirm the ability of either of these property/ies to meet “like for like or	Non-compliant	The BOS requires a BOMP implementation report to be developed. While management programs were in place and annual	Sections 6.5 & 11

Relevant Approval	Cond. #	Condition Description (Summary)	Compliance Status	Comment	Where addressed in Annual Review
		better” and “maintain or improve” conservation outcomes;		monitoring completed no report was developed for the 2014-2015 period.	
90WA822539	MK0577-00001	Details of the location of the water supply work on a copy of the Lot and Deposited Plan, its geographical reference accurate to +/- 5 m, and the respective distance(s) of the water supply work from the property boundaries;	Non-compliant	While the lot and DP are listed on the 'Form A's' provided a plan was not included.	Section 11

2 INTRODUCTION

This is the eighth Annual Review produced for the Narrabri Mine and has been prepared in accordance with the NSW Department of Planning and Environment's (DP&E) Integrated Mining Policy – Annual Review Guideline, October 2015. This document has been prepared to satisfy the following requirements:

- the Annual Review requirements of the DP&E under Project Approval (PA) 08_0144 (Schedule 6, Condition 6);
- Environmental Management Report requirements of the Division of Resources & Energy (DRE) under the Narrabri Mine Mining Lease (ML) 1609; and
- the routine reporting expectations of DPI-Water.

Though primarily covering the period from 1 April 2015 to 31 March 2016 (the reporting period), where relevant the Annual Review provides information on historical aspects of the Narrabri Mine, longer term trends in environmental monitoring results and provides relevant information on activities to be undertaken during the ensuing reporting period, or beyond.

2.1 PROJECT BACKGROUND

The Narrabri Mine is located within the Narrabri Local Government Area (LGA), approximately 30 km south-southeast of Narrabri, and 10 km north-northwest of Baan Baa, refer to **Figure 1**.

Narrabri Mine is a joint venture between: Narrabri Coal Pty Ltd (NCPL) (a company 100% owned by Whitehaven Coal Limited [Whitehaven]) (70%); Upper Horn Investments (Australia) Pty Ltd (7.5%); EDF Trading Australia Pty Limited (7.5%); J-Power Australia Pty Ltd (7.5%); and Daewoo International Narrabri Investment Pty Ltd & Kores Narrabri Pty Limited (7.5%). Narrabri Coal Operations Pty Ltd (NCOPL) (a wholly owned subsidiary of Whitehaven) manages the Narrabri Mine on behalf of the Narrabri Mine Joint Venture (NMJV).

An Environmental Assessment (EA) was prepared and submitted to the DP&E in March 2007. PA 05_0102 was subsequently granted on 13 November 2007. PA 05_0102 provided for the extraction of no more than 2.5 million tonnes per annum (Mtpa) of run-of-mine (ROM) coal and required all coal to be transported from the site via rail.

Since commencing Stage 1, continued geological exploration and a range of related technical studies were completed to evaluate the feasibility of converting the Stage 1 continuous mining operation to a longwall mining operation. Stage 2 operations were subsequently approved by the Minister for Planning on 26 July 2010, via PA 08_0144 (as modified). The Stage 1 approval was subsequently surrendered on 2 August 2011.

2.2 PROJECT DESCRIPTION

PA 08_0144 for the Narrabri Mine authorises the extraction of up to 11 Mtpa of ROM coal utilising longwall mining methods. Four modifications to PA 08_0144 have been approved by the Minister for Planning to date as follows: March 2011 (an administrative modification in relation to the Extraction Plan – PA 08_0144 MOD1); December 2011 (in relation to a one off transport of coal by road for an approximate 600 tonne bulk sample – PA 08_0144 MOD2); September 2015 (an extension to the coal stockpiles and associated water management works – PA 08_0144 MOD4); and December 2015 (increased longwall panel widths to 400m and increased production limit to 11 Mtpa – PA 08_0144 MOD5). Modification 3 regarding emergency road transport of product coal was lodged in December 2012 but was later withdrawn.

2.3 MINE CONTACTS

The key personnel responsible for operational and environmental management at the Narrabri Mine during the reporting period include:

- Steve Bow – General Manager, retains overall responsibility for all activities and performance at the mine. Contact: (02) 6794 4755.
- Gerald Linde – Mining Engineering Manager, retains statutory and mine management responsibility for all operational activities and safety performance at the mine. Contact: (02) 6794 4755.
- Owen Salisbury – Technical Services Manager, retains responsibility for technical aspects of the operation. Contact (02) 6794 4755.
- Steve Farrar – Environmental Superintendent, oversees day to day environmental performance across the site. Contact: (02) 6794 4755.

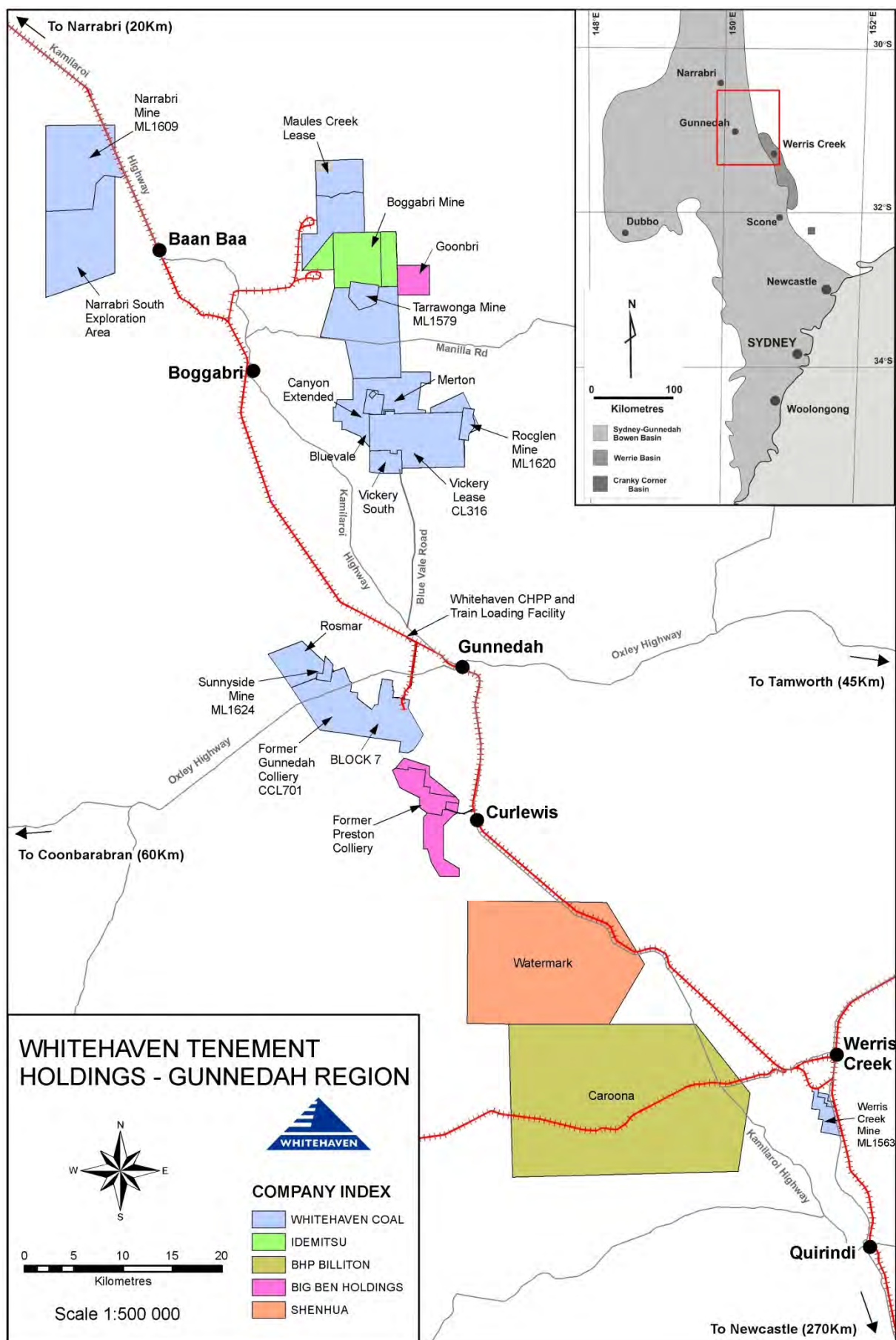


Figure 1: Project Locality Plan

3 APPROVALS

Table 5 provides a summary of the key licences, leases and approvals that have been obtained for the Narrabri Mine to enable the construction and operation of the mine.

Table 5: Licences, Leases and Approvals

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Division of Resources and Energy (DRE)	EL 6243	18 February 2015	20 May 2019	Approval for exploration. Renewed in 2015
Minister for Planning	PA 05_0102	13 November 2007	18 January 2029	PA for Stage 1. Surrender of the Stage 1 PA approved on 2 August 2011
DRE	ML 1609	18 January 2008	18 January 2029	Approval for mining
Environment Protection Authority (EPA)	Environment Protection Licence (EPL) 12789	20 February 2008	Nil – Anniversary date: 20 February	For mining operation >5,000,000 T (handled and produced)
Narrabri Shire Council (NSC)	Construction Certificate DP 816020 Inspection Report/Permit to Occupy No 2413	17 October 2008 6 August 2009	N/A	Stage 1 Mine Surface Facilities
DPI-Water	90CA811347 / WAL15922 90WA812891 / WAL20131 90AL807276 / WAL12833 90CA802130 / WAL6762 90CA802130 / WAL2671 90CA802130 / WAL2728 90CA802130 / WAL20152 90BL254679 / WA822539 90WA822539 90BL254481 - 90BL254487 90BL254658 - 90BL254663 90BL254701 90BL254958 - 90BL254967 90BL255167 - 90BL255173 90BL255216 - 90BL255218 90BL255769 – 90BL255772 90BL256060 – 90BL256064 90BL256289 90BL256293 90BL256344 90BL256346	Various	Various	GAB – Water supply (248ML) GW – Water supply (150ML) GW – Water supply (67ML) River – High Security (20ML) River (48ML) River (10ML) River (600ML) Mining (Low Security) (818ML) Mine De-gassing/De-Watering Groundwater Monitoring Purposes
Minister for Planning	PA 05_0102 MOD1	26 March 2010	18 January 2029	Notice of modification under Section 75W of the EP&A Act. PA surrendered, refer above.

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
Minister for Planning	PA 08_0144	26 July 2010	26 July 2031	PA for Stage 2
WorkCover NSW	Notification for explosives use and storage	5 August 2010	20 July 2020	Licence Number – XSTR100215
Narrabri Shire Council (NSC)	Construction Certificate DP 816020	23 September 2010	N/A	Stage 2 Mine Surface Facilities
Minister for Planning	PA 08_0144 MOD1	30 March 2011	26 July 2031	Notice of modification under Section 75W of the EP&A Act to update the subsidence management conditions.
	PA 08_0144 MOD2	21 December 2011	26 July 2031	Notice of modification under Section 75W of the EP&A Act to allow for a one-off road transport of coal to Tarrawonga Coal Mine.
	PA 08_0144 MOD4	22 September 2015	26 July 2031	Notice of modification under Section 75W of the EP&A Act for an expansion of the coal stockpiles.
	PA 08_0144 MOD5	9 December 2015	26 July 2031	Notice of modification under Section 75W of the EP&A Act to widen the longwall face and increase the annual production limit.
DRE	MOP 2011-2017 Amendment B	11 August 2011	31 December 2017	Details mining and rehabilitation activities during the applicable period.

4 OPERATIONS SUMMARY

4.1 EXPLORATION ACTIVITIES

Exploration drilling was undertaken during the reporting period to further assist production planning and assess coal reserves within ML 1609/EL 6243. A program of twenty-three exploration holes was completed during the reporting period.

4.2 CONSTRUCTION

During the reporting period the ROM coal stockpile was expanded. This work also included the addition of another dam, i.e. SB4, as approved by PA 08_0144 MOD4.

An easement for the extension of the 66kV power line was also cleared during the reporting period.

4.3 MINING OPERATIONS

Continuous miners support shuttle cars and feeder breakers to develop the underground roadways including ventilation overcasts and belt chambers. During the reporting period development extended into the main gate (MG) of longwall panel (LW) 107 and the mains, or the 100 panel. The longwall unit has previously extracted LW101 to LW104. At the end of the reporting period the longwall unit was extracting LW105. The underground-in-seam (UIS) drilling program continues. Gas from the drill holes is reticulated via underground pipework to vertical wells that are connected to the gas drainage plant on the surface.

Product coal generated by the Narrabri Mine includes bypass coal (i.e. ROM coal that is crushed and screened separate to the Coal Handling and Preparation Plant (CHPP)) and coal that is processed in the CHPP. The Product coal is stockpiled and fed via conveyors to the Train Load Out (TLO) facility. Once loaded, trains travel from the mine via the Narrabri Mine rail loop and the Werris Creek to Mungindi Railway Line to the Port of Newcastle for export.

Table 6 presents the production summary for the previous and current reporting periods and the anticipated production schedule for the next reporting period.

Table 6: Production Summary

Material	Approved limit	Previous reporting period (actual)	This reporting period (actual)	Next Reporting period (forecast)
Waste Rock / Overburden	657,000 m ³ (2010 MOP, Table 3.8)	657,000	0	0
ROM Coal*	11 Million Tonnes CY (PA 08_0144 Sch. 2, Cond.6) > 5 Million Tonnes produced (EPL 12789)	6.73	8.19	7.11
Reject Material	N/A	0.13	0.14	0.14
Saleable Product	> 5 Million Tonnes handled (EPL 12789)	6.09	8.03	6.97

* - ROM Coal is total production at the mine site. The difference between ROM Coal and final product is related to changes in stockpile volumes at the mine.

4.4 OTHER OPERATIONS

4.4.1 Hours of Operation

The approved hours of operation are provided in **Table 7**.

Table 7: Hours of Operation

Activity	Hours / Days
Mining Operations	
Pit Bottom Area development	24 hours / 7 days
Underground mining	24 hours / 7 days
Gas drainage	24 hours / 7 days
Ventilation fan operation	24 hours / 7 days
Coal processing and handling	24 hours / 7 days
Rail loading and transportation	24 hours / 7 days
Surface maintenance	24 hours / 7 days
CHPP reject disposal	24 hours / 7 days ¹
Raw materials / supply delivery	7:00am to 10:00pm / 7 days
1: Reject disposal activities will generally be restricted to 7:00am to 10:00pm, 7 days per week. However, it is possible that the proportion of reject material generated by the CHPP may exceed the predicted average 5% level for short periods. To account for these periods of elevated reject production, contingent hours of operation will be 24 hours / 7 days (when inversion conditions do not prevail).	

4.5 NEXT REPORTING PERIOD

4.5.1 Exploration

Exploration drilling will continue to be undertaken at the Narrabri Mine to further assess the coal reserves within the tenements. The focus of the ongoing exploration drilling is likely to involve the following:

- investigation of the JORC resource status within ML 1609, in accordance with the DRE requirements for exploration leaseholders;
- further exploration within EL 6243; and
- further delineation of outlying coal prospective areas.

Further details of the proposed drilling program are provided in the MOP.

4.5.2 Remaining Construction Activities

The expansion of the product coal stockpile, augmentation of dam SB1 and the 66kV powerline extension will be completed during the next reporting period.

4.5.3 Mine Operations

The mine production rate for the next reporting period will be slightly less than this year as there are two longwall moves planned during the period. The mine is planning to produce 7.11 Mt of ROM coal and approximately 0.14 Mt of coarse reject material during the next reporting period.

Vegetation clearing activities in mining areas over the next reporting period will be conducted in accordance with the MOP.

4.5.4 Mining Fleet Upgrades

During the next reporting period the mine will upgrade the longwall unit to allow for the mining of 400m wide longwall panels. This will not require any additional infrastructure to be constructed at the mine.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The 2014-2015 Annual Review and subsequent regulatory site inspection identified the following actions. These are addressed within this document and also summarised in **Table 8**.

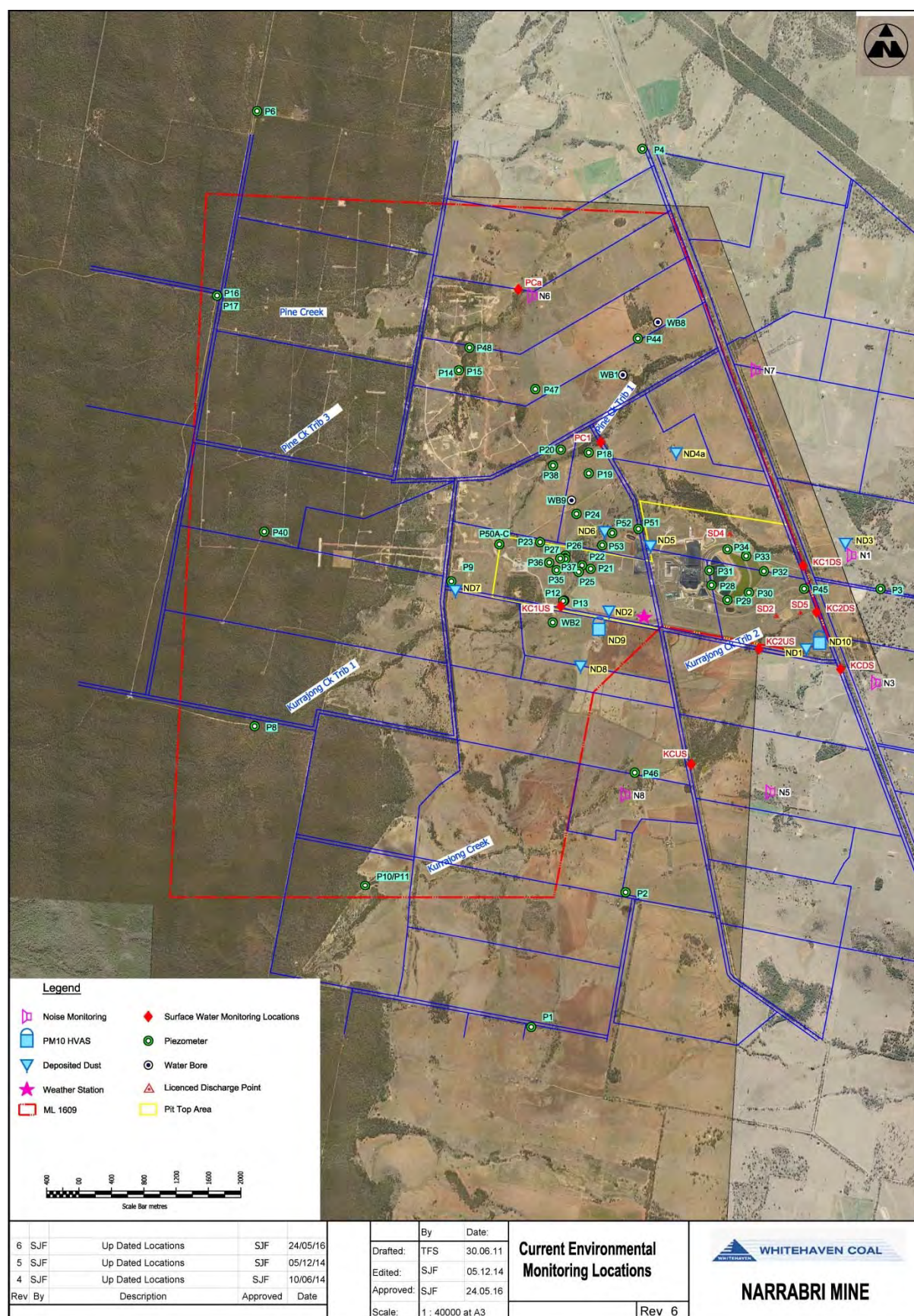
Table 8: Actions from the Previous Annual Review (2014-2015)

Action required from Previous Annual Review	Requested By	Action Taken by the Operator	Where discussed in Annual Review
DRE requires that a minimum of two (2) metres of inert material be placed over coal reject material on completion of all reject storage facilities. This requirement can be waived with DRE's acceptance of an alternative capping design that is able to clearly demonstrate acceptable environmental outcomes for the final landform. A Narrabri Coal Pty Ltd commitment to provide a REA cap acceptable to DRE should be given in either the next Mining Operations Plan (MOP) Amendment or new MOP.	DRE	The mine commissioned a review of the capping thickness for the REA and intends to use this information to update the mine's MOP. This will be finalised during the next reporting period.	Section 8.1.11
Sow subsidence affected areas with designated seed mix when soil moisture will support germination and establishment.	DRE	No seeding has occurred as conditions remain unfavourable. When conditions improve the mine will plough and seed areas over the longwall mining area.	Section 6.13
Investigate and implement management measures for area of water ponding (as per nomination in the 2014/15 AEMR for the 2015/16 period).	DRE	Ponding Management Plan developed during the reporting period with feedback received from DRE and OEH. To be finalised next reporting period.	Section 6.13
In accordance with Schedule 6, Condition 6 (b), for all environmental performance issues please include a comprehensive review of the monitoring results and complaints records of the project over the past year, which includes a comparison of these results against the: - the relevant statutory requirements, limits or performance measures/criteria; - the monitoring results of previous years; and - the relevant predictions in the EA and Extraction Plan.	DP&E	Included in this 2015-2016 Annual Review where required by the Annual Review Guideline (October 2015).	Throughout this Annual Review
In accordance with Schedule 6, Condition 6 (d), for	DP&E	Included in this	Sections 6 & 7

Action required from Previous Annual Review	Requested By	Action Taken by the Operator	Where discussed in Annual Review
all environmental performance issues please identify any trends in the monitoring data over the life of the project.		2015-2016 Annual Review	
In accordance with Schedule 6, Condition 6 (e), for all environmental performance issues please identify any discrepancies between the predicted and actual impacts of the project, and analyse the potential cause of any significant discrepancies.	DP&E	Included in this 2015-2016 Annual Review	Throughout this Annual Review
In accordance with Schedule 6, Condition 6 (f), for all environmental performance issues describe what measure will be implemented over the next year to improve the environmental performance of the project.	DP&E	Included in this 2015-2016 Annual Review	Sections 6, 7, 8, 9 and 11
Section 3 should include a statement of compliance for each environmental performance issue.	DP&E	Included in this 2015-2016 Annual Review	Section 1
The key activities for the next reporting period should be discussed.	DP&E	Included in this 2015-2016 Annual Review	Section 12
Rehabilitation monitoring and performance discussed in the Annual Review should reflect the monitoring requirements in the Landscape Management Plan.	DP&E	Included in this 2015-2016 Annual Review	Section 6.5

6 ENVIRONMENTAL PERFORMANCE

The following sub-sections report on the environmental performance achieved during the reporting period and provides a summary of the environmental monitoring data compared to data predictions, trends and management measures. Environmental monitoring locations are illustrated on Figure 2.



6.1 NOISE

6.1.1 Environmental Management

Potential noise impacts associated with the Narrabri Mine are managed in accordance with the:

- Noise Criteria and Operating Conditions prescribed under Schedule 4, Conditions 1 to 5 of PA 08_0144;
- EPL 12789 Conditions L3, M3, M7, R4 and E2; and
- the Narrabri Mine Noise Management Plan (NMP) approved by DP&E prepared to satisfy the requirements of PA 08_0144.

During the reporting period various controls were implemented to manage noise including:

- Prior to being brought onto site, or upon commissioning, all additional plant and equipment is required to exhibit sound power levels consistent with those levels specified in the Noise Management Plan (NMP);
- High frequency reversing alarms are not permitted on any equipment brought onto site. Rather, all reversing alarms should be of the broadband frequency type;
- Ensure specific noise attenuation is provided to surface drills when operating over LW1 to LW3 and LW124 to LW126 to achieve a sound power level of 109dB(A);
- The approved hours of operation are adhered to;
- Site personnel are required to pay due attention to site weather conditions and modify or stand down from operational activities if directed by mine management; and
- Monitoring of emitted noise levels is undertaken during mining operations to verify compliance with noise criteria and to assess the need, if any, for additional noise attenuation measures.

The Narrabri Mine noise monitoring network is illustrated on Figure 2 and includes:

- Continuous monitoring at one real-time monitoring unit for management purposes. This unit is mobile; and
- Quarterly attended monitoring at three locations as described in the EPL (N1, N5 and N6) and monthly attended monitoring during winter at six locations as described in the NMP (N1, N3, N5, N6, N7 and N8).

6.1.2 Environmental Performance

Attended Monitoring

The NMP details the requirements for attended and real-time noise monitoring as described above. Attended noise monitoring sites are identified on Figure 2. Attended monitoring is completed by an independent consultant and is used to assess compliance with licence and approval limits for mine contributed noise. A summary of the noise monitoring results above the criteria at privately-owned residences where a private agreement is not in place are provided below.

On the 26th May 2015 there was a 3 dB exceedance of the $L_{Aeq(15minute)}$ criterion at monitoring location N8. An investigation indicated that mine hum and dozer tracks were the source of the mining related noise. As this was the first exceedance recorded at the residence the mine continued to monitor noise levels to confirm compliance and that the exceedance was not systemic.

On the 24th and 25th June 2015 there was a 3 and 5 dB exceedance, respectively, of the $L_{Aeq(15minute)}$ criterion at monitoring location N7. An investigation indicated that mine hum and dozer tracks were the source of the mining related noise. The mine at the time of the exceedance was in negotiations to

purchase the property. The purchase of N7 has since been completed and negotiations are continuing for the adjacent property.

On the 24th June 2015 there was a 5 dB exceedance of the $L_{Aeq(15\text{minute})}$ criterion at monitoring location N5. An investigation indicated that dozer tracks were the main source of the mining related noise. The mine committed to undertaking additional monitoring to confirm noise levels at the residence. Another two exceedances were noted during monitoring on the 15th and 16th July 2015 however these were likely recorded under non-compliant meteorological conditions, which meant the noise limits did not apply, i.e. temperature inversion conditions. Monitoring undertaken since has confirmed noise levels are in compliance and are not systemic in nature.

Attended noise monitoring results are also assessed against the modifying factor corrections outlined in the 'Industrial Noise Policy' (INP). All results indicate that the noise recorded did not contain any tonal, impulsive or low frequency components as outlined in the INP.

Sound Power Testing

Sound Power Level (SPL) testing of fixed and mobile plant has been undertaken during the reporting period. This testing is done to ensure equipment used onsite can meet the SPL's identified in the EA. Equipment tested during the reporting period included field generators and a new stockpile dozer, refer to **Table 9**.

Table 9: SPL Measurements

Noise sources	Scenario	Noise Level (dB(A))	EA Limit
Generator and Venturi 16 April 2015	-	104	109
New CAT D11 Dozer 12 August 2015	1 st Gear Reverse	111	118
	2 nd Gear Reverse	112	118

The Narrabri Mine is currently working with the Original Equipment Manufacturer (OEM) and specialist consultants to investigate options for SPL reductions on the stockpile dozer fleet.

6.1.3 Proposed Improvement Measures

A number of improvement measures are proposed for the next reporting period including:

- Additional two real-time noise units to assist in managing noise at the mine;
- Installation of a temperature inversion tower to better understand these conditions around the site;
- Maintaining equipment exhausts and conducting noise testing of plant; and
- Investigate options for reducing SPL's on the stockpile dozer fleet.

6.2 BLAST

As there has not been any surface or near-surface blasting at the site during the reporting period, no blast monitoring has been required or conducted.

6.3 AIR QUALITY

6.3.1 Environmental Management

The Narrabri Mine has the potential to impact on air quality at the mine. Air quality impacts at the mine are managed in accordance with the:

- Air quality criteria prescribed under Schedule 4, Condition 6 of the PA 08_0144;
- EPL 12789 Conditions O3, P1 and M2; and
- the Narrabri Mine Air Quality Management Plan (AQMP) prepared to satisfy the requirements of PA 08_0144.

Narrabri Mine employs a range of air pollution control measures including:

- Cleared trees and branches will be retained on the margins of cleared areas for use in stabilising disturbed areas once they are no longer required;
- Trigger Action Response Plans (TARPs) have been developed for the major dust generating activities onsite which currently includes: the coal processing area; surface drilling activities; and surface civil works;
- Strategically located water sprays will be operational on all continuous miners, the longwall unit and the breaker feeder to minimise dust creation underground;
- All conveyers will be fitted with appropriate cleaning and collection devices to minimise the amount of material falling from the return conveyer belts;
- The coal breaker is enclosed;
- All surface conveyors are partly enclosed to minimise dust lift-off;
- Clear definition of all the site roads and the restriction of vehicles and equipment to the roads;
- Progressive rehabilitation of areas of disturbance including topsoil and subsoil stockpiles;
- Routine application of water sprayed onto stockpiles and hardstand areas; and
- Construction of a perimeter amenity bund and windbreaks.

The Narrabri Mine air quality monitoring network is illustrated on **Figure 2** and includes:

- PM₁₀ levels are measured by two High Volume Air Sampler (HVAS) for a twenty-four hour period every six days. Total Suspended Particulate (TSP) matter is inferred at a ratio of 1:2 from the measured PM₁₀ data; and
- a network of eight dust deposition gauges (DDGs), measuring deposited dust and particulates collected monthly.

A summary of the air quality monitoring results at the Narrabri Mine for the reporting period is provided below.

Table 10: Deposited Dust Monitoring Data Summary for the Reporting Period

Site (see Figure 2)	EPL ID No.	Property Name	Annual Mean Total Insoluble Solids (g/m ² /month)	Annual Mean Ash (g/m ² /month)
ND1	-	Turrabaa	3.6	1.7
ND2	-	Claremont	4.2	2.2
ND3	3	Bow Hills	0.8	0.4

Site (see Figure 2)	EPL ID No.	Property Name	Annual Mean Total Insoluble Solids (g/m ² /month)	Annual Mean Ash (g/m ² /month)
ND4	-	Matoppo	2.7	1.4
ND5	-	Claremont	3.4	1.5
ND6	-	Willarah	0.9	0.4
ND7	-	Claremont	1.7	1.0
ND8	-	Claremont	1.6	1.0

Table 10 indicates that all the monitoring locations are below the annual average criteria with the exception of ND2. The ash content in samples collected from ND2, which indicate mineral type contamination, reported an average of 2.2 g/m²/mth. This indicates that there was significant contamination from organic matter, which is not attributable to site operations.

As most of the properties surrounding the site are now mine owned, only ND3 is included for both offsite impacts in the Stage 2 Environmental Assessment (EA) and current monitoring, as outlined in Narrabri Mine's AQMP. The predicted dust levels as outlined in the EA under both scenarios has dust levels at ND3 increasing by 0.1 g/m²/month above the back ground level of 1.6 g/m²/month. The reporting period average for ND3 is 0.8 g/m²/month and the long-term average is 1.5 g/m²/month. The results indicate that the dust deposition levels for this reporting period and the long-term average are below the predicted levels. It should also be noted that a quarry is in operation on the property where ND3 is located, which may contribute to deposited dust on the site.

Monitoring conducted at the Narrabri Mine HVAS's indicates that the PM₁₀ annual averages remain well below the applicable criteria of 30 µg/m³ at both units, i.e. ND9 and ND10. The PM₁₀ 24 hour measurements were also below the applicable criteria of 50 µg/m³ for the reporting period. The ND9 and ND10 HVAS PM₁₀ monitoring results are illustrated in **Figure 3** and **Figure 4** below.

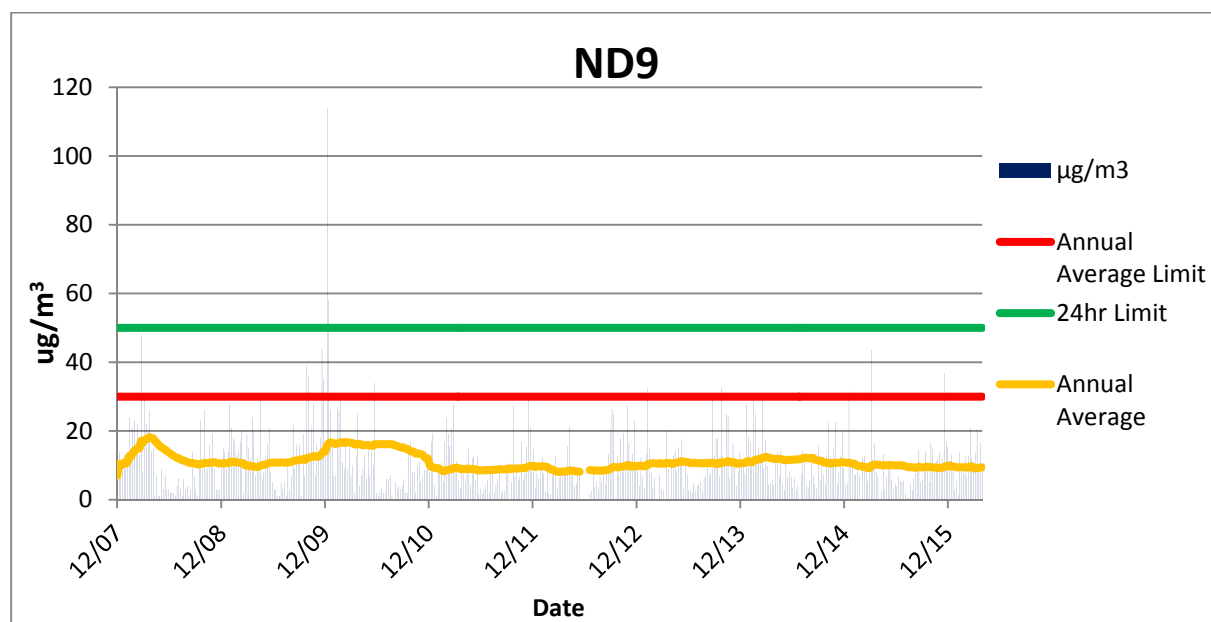


Figure 3: ND9 PM₁₀ Results

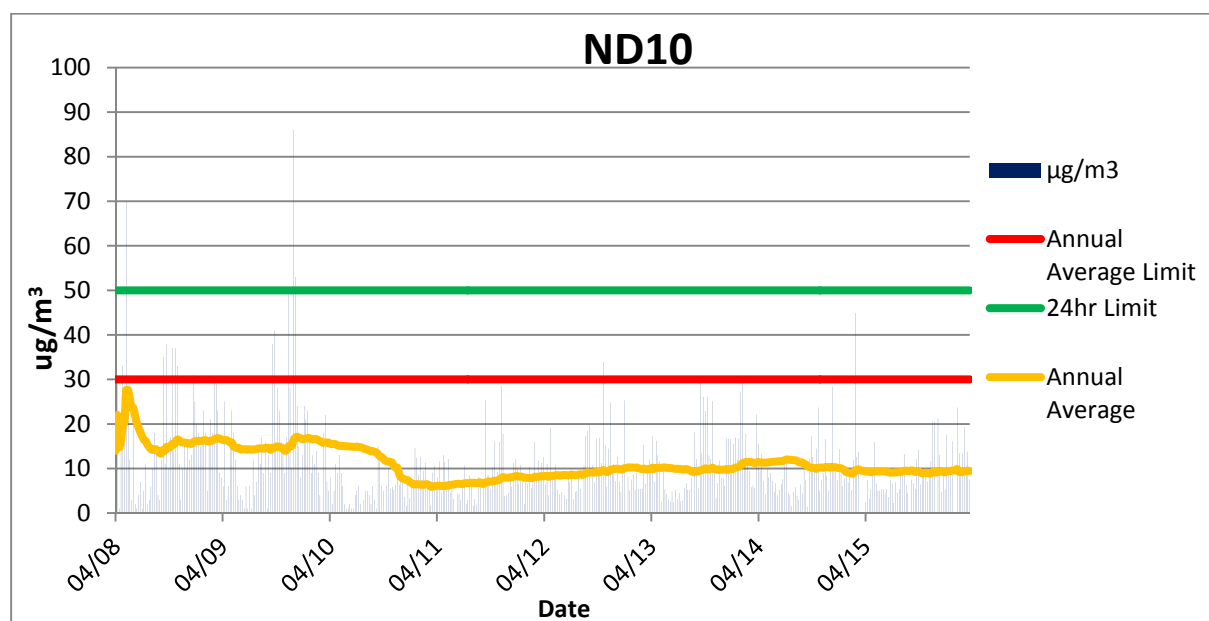


Figure 4: ND10 PM₁₀ Results

Although PM₁₀ is not monitored at the properties modelled in the EA, but on properties closer to mining operations as outlined in the Narrabri Mine AQMP, the lowest predicted annual average under both scenarios in the EA is 15.9 µg/m³. The highest annual average results for the Narrabri Mine monitoring program is 9.45 µg/m³. In addition, the highest 24-hour concentration recorded during the reporting period was 36.8 µg/m³. The highest predicted 24-hour level in the EA for residences further away from the mine than the monitored locations was 69.7 µg/m³. No exceedances of the 24-hour criteria (i.e. 50 µg/m³) occurred during the reporting period. **Figure 3** and **Figure 4** also indicate that the monitoring results are generally stable when compared to previous years.

The results for the PM₁₀ monitoring also confirm that the TSP criteria for the mine are well within the compliance limits. The DP&E have previously advised that Whitehaven's method for determining TSP concentrations, i.e. multiplying PM₁₀ concentrations by a factor of 2, is satisfactory. Based on the above, the annual average TSP concentrations of 18.83 µg/m³ at ND9 and 18.90 µg/m³ at ND10 are both below the 90 µg/m³ annual average criteria.

6.3.1.1 Meteorological Data

Meteorological monitoring is conducted onsite in accordance with Schedule 4, Condition 8 of PA 08_0144 at the Narrabri Mine meteorological station. Additional weather data is available from other monitoring locations for reference purposes. The location of the Narrabri Mine meteorological station is illustrated on Figure 2. **Table 11** summarises the monthly meteorological conditions recorded at the Narrabri Mine station for the reporting period.

Table 11: Summary of Meteorological Conditions

Month	Measured Rain (mm)	Cumulative Rainfall (mm)	Rainfall Days (>1mm)	2m Temperature (°C)			Wind		Inversion Conditions
				Min	Mean	Max.	Av. Speed (m/s)	Predominant Direction	
Apr 2015	132.0	132.0	6	5.8	17.4	29.0	1.9	SE	1

Month	Measured Rain (mm)	Cumulative Rainfall (mm)	Rainfall Days (>1mm)	2m Temperature (°C)			Wind		Inversion Conditions
				Min	Mean	Max.	Av. Speed (m/s)	Predominant Direction	% of night time period*
May 2015	52.2	184.2	8	-0.4	14.2	26.2	2.1	SE	2
Jun 2015	60.8	245.0	4	-0.7	11.0	21.6	2.0	SE	2
Jul 2015	27.0	272.0	8	0.0	9.3	19.6	2.1	S, SE	2
Aug 2015	62.2	334.2	2	-1.7	11.2	24.5	1.8	NW	2
Sep 2015	16.6	350.8	2	0.5	15.1	27.6	2.3	SE	2
Oct 2015	29.4	380.2	3	9.5	23.6	34.7	2.4	NW, SE	1
Nov 2015	111.4	491.6	6	11.3	24.8	40.5	2.6	NW, SE	1
Dec 2015	35.6	527.2	6	13.2	25.5	38.0	3.1	SE	1
Jan 2016	106.6	633.8	9	13.7	25.3	38.4	2.8	SE	1
Feb 2016	31.2	665.0	2	14.1	27.0	41.1	3.3	SE	1
Mar 2016	16.8	681.8	3	11.2	25.1	36.2	2.2	SE	1

* - Inversion conditions as measured by the site weather station.

The total annual rainfall for the year was 681.8 millimetres (mm). The annual rainfall total was slightly above the historical average of 658 mm. The maximum rainfall was recorded during April 2015 (132.0 mm), which is significantly higher than the historical average of 38.6 mm. The months of July 2015, September 2015, October 2015, December 2015, February 2016 and March 2016 were relatively dry in comparison to historical averages. However, the recordings are consistent with the long-term seasonal trends of summer dominant rainfall reducing throughout winter.

During the reporting period the minimum temperature was -1.7°C recorded in August 2015 and the maximum temperature was 41.1°C in February 2016. The temperature records are slightly above the historical averages and the wind patterns are consistent with previous reporting periods.

Measured winds were predominantly from the SE throughout most of the year apart from August 2015 where NW winds were dominant. During October and November 2015 the dominant wind directions were SE / NW of equal distribution. Comparison with the wind roses from the 2014-2015 data indicate similar patterns which are broadly comparable to patterns observed from previous years.

6.3.2 Proposed Improvement Measures

No additional improvement measures are proposed during the next reporting period.

6.4 GREENHOUSE GAS

6.4.1 Environmental Management

Greenhouse Gas (GHG) emissions at the Narrabri Mine are managed in accordance with Schedule 4 Conditions 31 and 32 of PA 08_0144 and the Greenhouse Gas Minimisation Plan (GHGMP). The main sources of GHG emissions considered in the GHGMP are:

- Consumption of diesel fuel – Scope 1;
- Consumption of electricity – Scope 2;
- Pre-drainage gas – Scope 1;

- Goaf gas – Scope 1; and
- Ventilation exhaust gas – Scope 1.

6.4.2 Environmental Performance

The GHGMP estimated annual average Scope 1 and Scope 2 emissions 410,322 t CO₂-e. For the reporting period the mine produced an estimated total of 463,279 t CO₂-e. This has increased since the previous reporting period where the mine produced 328,102 t CO₂-e. The increase is in relation to the increased emissions calculated from the mines ventilation circuit, which may attributable to the additional 1.47Mt of ROM coal produced during this reporting period compared to the previous reporting period.

6.4.3 Proposed Improvement Measures

As the concentrations of methane in the ventilation and pre-drainage gas streams remain prohibitive for any beneficial use, no additional management measures are to be implemented during the next reporting period. Any additional mining fleet equipment will also include preventative and regular maintenance.

6.5 BIODIVERSITY

6.5.1 Environmental Management

Biodiversity was managed in accordance with:

- Schedule 5, Conditions 1 to 7 of PA 08_0144; and
- the Narrabri Mine Landscape Management Plan (LMP) and Biodiversity Offset Strategy (BOS) prepared to satisfy the requirements of PA 08_0144.

Various treatments were implemented during the reporting period to mitigate impacts of the Narrabri Mine including (but not limited to):

- Weed monitoring and inspections;
- Feral animal monitoring and inspections;
- Flora and Fauna monitoring; and
- Fuel load assessment.

6.5.2 Environmental Performance and BOMP Implementation

Weed Management

Weed monitoring and management was undertaken across the mine site and offset areas during the period. This included treating areas for Box Thorn, Mother-of-Millions and a comprehensive Green Cestrum and Coolatai Grass control program at the Narrabri Mine offsite offset area known as 'Kenna'. Appropriately qualified and experienced weed contractors (AQF3 accreditation or higher for use of herbicide) were engaged to undertake the following Green Cestrum and Coolatai Grass control works:

1. Basal barking of isolated or low density Green Cestrum infestations to minimise disturbance and off-target impacts; and
2. Foliar spraying of large infestations with a riparian sensitive herbicide and surfactant.

Feral Animals

Monitoring of the presence of feral animals was undertaken onsite and in the Narrabri Mine offset area known as 'Kenna'. A targeted monitoring program for feral pigs was undertaken in Spring 2015 on the 'Kenna' property which determined that there was a low abundance of pigs.

An annual feral animal monitoring program was undertaken in December 2015 using multiple methodologies (i.e. sand plot, transect, baited stations and camera traps) to better target for specific feral animal species to improve total population records and refine estimates. The DECCW/CSIRO "The Sand Plot Technique" was used to rate abundance from sand pad results and determine a population level rank (scare, low, medium and high) for particular species in comparison to standards across NSW eucalypt forests. This identified a medium abundance of kangaroos, a low abundance of foxes and a scarce abundance of wild dogs, foxes, rabbits, hares, and cats. This information will be used to formalise a Vertebrate Pest Management Program (VPMP) to be implemented in the next reporting period.

Annual Extraction Plan Monitoring

The results of annual monitoring undertaken during the reporting period, as required by the Extraction Plan, which includes the LMP, are summarised in **Table 12** and **Table 13**.

Table 12: Biodiversity Management Plan 2015 Monitoring Results

Performance Measures	BMP Performance Criteria	2015 Assessment	Comment
Woodland vegetation (Inland Grey Box EEC) composition and health	Clearing does not exceed the allowable limit of the Project Approval	Compliant	
	Less than 10% change in floristic composition (relative to natural variation found in control areas)	Compliant	
	Less than 10% increase in exotic species numbers and cover	Compliant	
	No increase in feral animal presence	Compliant	
Riparian vegetation composition and health	Clearing does not exceed the allowable limit of the Project Approval	Compliant	
	Less than 10% change in floristic composition (relative to natural variation found in control areas)	Compliant	
	Less than 10% increase in exotic species numbers and cover	Non-compliant	This criterion was exceeded at Plot 1, 3 and 10. The combination of disturbance and heavy rainfall in the lead up the spring surveys may have provided good conditions for weeds to germinate. Declared noxious weeds African Boxthorn, Mother of Millions and Prickly Pear continue to be present on site and require ongoing treatment as prescribed in the

Performance Measures	BMP Performance Criteria	2015 Assessment	Comment
			RMP.
	No increase in feral animal presence	Compliant	
Terrestrial fauna habitat for threatened species	Fauna populations do not experience adverse impacts	Compliant	
	Fauna records decrease by greater than 10% (relative to natural variation found in control areas)		
Aquatic macro-invertebrate and macrophyte assemblages	No decline in aquatic habitat quality relatively to natural variation in control areas	Not monitored in 2015	

Table 13: Land Management Plan 2015 Monitoring Results

Performance Measures	Performance Criteria	2015 Assessment	Comment
<i>Surface cracking</i>			
Surface cracking inspection	Permanent cracks (which do not self-close within one month of longwall face passing) are remediated as soon as practicably possible (and safe to do so) Surface cracking is remediated to prevent erosion and slope instability issues within 6 months of each longwall pass	Compliant	Surface cracking evident over LW104; however, not as wide or deep as those that formed over LW101-LW103
<i>Topographic form (Lidar)</i>			
Landscape morphology	Subsidence across landscape does not exceed subsidence predictions for LW101-LW106	Not assessed in 2015	
Creeklines	No identifiable change in overall drainage pattern	Compliant	
<i>Soil moisture and nutrient distribution (EM mapping) - Not assessed in 2015</i>			
Groundcover (multi-spectral images – erosion and pasture cover)	Identified areas of NDVI change (greater than 1 standard deviation from the mean change) investigated in the field to determine the source of the change.	Compliant	Areas of NDVI attributed to land management, surface disturbance works and re-establishment of groundcover
<i>Pasture</i>			

Performance Measures	Performance Criteria	2015 Assessment	Comment
Pasture biomass	Less than 20% reduction in pasture biomass in impact zones in comparison to control zones	Compliant	
Weed species	Weed species identified and managed according to the weed management measures provided in the Rehabilitation MP	Compliant	
Weed cover	Less than 10% increase in weed cover in impact zones in comparison to the control zone	Compliant	One area of significant increase recorded (transition zone LW101). Weed occurrence a result of localised disturbance.

Creek stability and condition

Field survey of creek stability and condition	Less than 20% increase in creek erosion (bank and bed) in comparison to control Less than 20% increase in cross-sectional area in comparison to control cross-sectional area (unless stabilisation works have been undertaken)	Compliant	
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Annual BOS Monitoring

Kenna

The 2015 monitoring surveys (Narrabri Mine 2015 Biodiversity Offset Monitoring, Parsons Brinckerhoff 2016) within the Kenna Biodiversity Offset Area (BOA) identified 111 species from 47 families, of which 89 (80%) were native. The most species rich families were the Asteraceae (17 species) and Poaceae (18 species). Compared to the results of the baseline monitoring in 2012 and the 1st year of monitoring a reduction in overall species richness were found (127 species in 2012, 128 species in 2013 and 105 species in 2014). Whilst the overall percentage of native species recorded reduced from 86% in 2014 to 80% in 2015 it remains higher than that of the 2012 results which indicated that 76% of the plant species recorded were native. No threatened species of plant were recorded within the Kenna BOA. A complete flora species list is included as Appendix A and photo monitoring records are included as Appendix B as required by the BOS and the associated management plans.

During the 2015 monitoring survey (Narrabri Mine 2015 Biodiversity Offset Monitoring, Parsons Brinckerhoff 2016), 131 animal species, including 104 birds, 17 mammals, 13 reptiles and six frogs were recorded within the Kenna BOA. This included five introduced mammals, including Fox, Goat, Pig, Rabbit and Brown Hare. These numbers and species richness are comparable to those recorded during baseline monitoring surveys completed in 2012 and the 2014 monitoring event (**Table 14**). A complete fauna species list is included as Appendix C as required by the BOS and the associated management plans.

Table 14: Comparative Fauna Species Richness, Kenna BOA

FAUNAL GROUP	2012		2013		2014		2015	
	NATIVE	FERAL	NATIVE	FERAL	NATIVE	FERAL	NATIVE	FERAL
Birds	95	2	70	0	98	2	102	2
Mammals (exc. Bats)	5	5	8	4	5	6	3	5
Microbats	14	0	16	0	12	0	9	0
Reptiles	8	0	6	0	10	0	13	0
Frogs	5	0	6	0	6	0	6	0
Total	127	7	106	4	131	8	133	7

One migratory species of bird, White-throated Needle-tail, which is listed under provisions of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) was recorded over the Kenna BOA.

Five species of bird listed as Vulnerable under the *Threatened Species Conservation Act 1995* (TSC Act) were recorded within the Kenna BOA, including Grey-crowned Babbler, Little Eagle, Little Lorikeet, Speckled Warbler and Turquoise Parrot. While not recorded within the Kenna BOA, the Brown Treecreeper was heard calling in vegetation adjacent to the BOAs northern boundary; north of S7. Two microchiropteran bats, Yellow-bellied Sheath-tail-bat and Eastern False Pipistrelle, which are listed as Vulnerable under the TSC Act, were recorded via Anabat ultrasonic detector within the Kenna BOA.

Onsite

The 2015 monitoring surveys (Narrabri Mine 2015 Biodiversity Offset Monitoring, Parsons Brinckerhoff 2016) within the Mine BOA identified 118 species from 48 families, of which 100 (85%) were native. The most species rich plant families were Poaceae (23 species), Asteraceae (12 species) and Fabaceae (both with 10 species). Compared to the results of the monitoring in 2014, an increase in species richness was observed in the Mine BOA compared to 96 species in 2014. These results are largely due to an increase in observable grasses and herb species richness due to the occurrence of seasonal rainfall and improved growing conditions prior to the 2015 monitoring period. A complete flora species list is included as Appendix A and photo monitoring records are included as Appendix B as required by the BOC and the associated management plans.

During the 2015 monitoring survey (Narrabri Mine 2015 Biodiversity Offset Monitoring, Parsons Brinckerhoff 2016) 114 animal species, including 81 birds, 22 mammals, eight reptiles and three frogs were recorded within or immediately adjacent to the Mine BOA. This included six introduced mammals (Fox, Pig, Goat, Rabbit, Brown Hare and Cat) and one domestic species (Sheep). These numbers and species richness are comparable to those recorded during baseline monitoring surveys completed in 2012 and subsequent monitoring events in 2013 and 2014 (**Table 15**). A complete fauna species list is included as Appendix C as required by the BOC and the associated management plans.

Table 15: Comparative Fauna Species Richness, Onsite BOA

FAUNAL GROUP	2012		2013		2014		2015	
	NATIVE	FERAL	NATIVE	FERAL	NATIVE	FERAL	NATIVE	FERAL
Birds	77	2	60	0	76	0	81	0
Mammals (exc. Bats)	3	5	2	4	2	5	6	7
Microbats	12	0	14	0	11	0	9	0
Reptiles	5	0	7	0	6	0	8	0
Frogs	3	0	5	0	1	0	3	0
Total	100	7	88	4	96	5	107	7

One migratory species of bird, White-throated Needletail, which is listed under provisions of the EPBC Act was recorded over the Mine BOA.

Five species of bird listed as Vulnerable under the TSC Act were recorded within or immediately adjacent to the Mine BOA, including, Glossy Black-cockatoo, Grey-crowned Babbler, Speckled Warbler, Turquoise Parrot and Varied Sittella. Two threatened species of mammal (not including microchiropteran bats), including Squirrel Glider and Black-striped Wallaby, were recorded within the Mine BOA. The Squirrel Glider, which is listed as Vulnerable under the TSC Act, was recorded for the first time during annual biodiversity offset monitoring during a spotlight event at replicate survey site 13. The Black-striped Wallaby, which is listed as Endangered under the TSC Act, was recorded at replicate survey site 17 via a remote sensing camera trap. Two microchiropteran bats, Yellow-bellied Sheath-tail-bat and Eastern False Pipistrelle, which are listed as Vulnerable under the TSC Act, were recorded via Anabat ultrasonic detector within the Mine BOA.

Recommendations from the annual BOA monitoring (Narrabri Mine 2015 Biodiversity Offset Monitoring, Parsons Brinckerhoff 2016) undertaken in accordance with the BOS include:

- To increase the efficacy of the monitoring program while ameliorating workplace hazards (i.e. driving long distances on remote unsealed roads during dusk and night time hours), reducing labour costs and avoiding wasted resources, it is recommended that a number of changes be considered, subject to revision of the Kenna BOA and Mine BOA monitoring plans. Suggestions for improvement include:
 - o Simplify the fauna components of the monitoring programs to only include species groups that will likely provide sufficient data to detect change over time.
 - o Data collected for reptiles, raptors and owls from 2012 – 2015 did not represent numbers sufficient to reliably predict real population change in response to changing environmental conditions. This trend would likely continue for the life of the monitoring program.
 - o Good examples of target groups that will likely return reliable and repeatable data are diurnal birds and microchiropteran bats. Targeting monitoring to fewer species groups will avoid wasted time and resources.
 - o Survey methodologies such as spotlighting, call playback and active reptile searches could be considered on an approximate five yearly basis.
- Although both crown cover and projected foliage cover are collected during monitoring surveys, it is recommended that the native over-storey and mid-storey covers are compared using the PFC method as per the BioBanking Assessment Methodology for future monitoring as it aligns to the biometric benchmark values and is less prone to variances than those observed in crown cover.

- Due to the paucity of threatened species of plant currently recorded from permanent flora monitoring plots, it is recommended that a selection of additional 'spot' transects across the known distribution of *B. opposens* and *P. queenslandica* be adapted to permanent threatened flora monitoring plots.
- Given the multi-stemmed nature and multi-aged structure of *B. opposens* it is essential that a robust sampling methodology be employed for determining the number of individual plants or stems within permanent threatened flora monitoring plots. Therefore, to provide a more reliable and repeatable collection of data, it is recommended that a modified sampling methodology be used to record or estimate the abundance of threatened flora within the Mine BOA.

Pre-Clearing and Clearing Surveys

During the reporting period the mine has undertaken clearing to facilitate surface gas drainage infrastructure works. The ecological works for the clearing consisted of the following activities;

- Threatened Flora Surveys;
- Fauna Pre-clearing Surveys;
- Clearance Supervision; and
- Post-felling inspections.

Prior to the commencement of any clearing activities the limits of clearing are surveyed and physically marked with flagging tape. Targeted threatened flora surveys were conducted prior to clearing activities commencing with all threatened flora identified during these surveys recorded and their locations mapped using hand held GPS units.

Fauna pre-clearance surveys were also conducted and consisted of identifying, marking and documenting suitable fauna habitat features. These features generally include nests, large woody debris and trees bearing hollows, which have the potential to support species such as bats, gliders, possums, reptiles and birds. All trees with habitat features are felled following a clearing protocol and is done in the presence of a qualified ecologist. All trees identified as having habitat features were recorded using a hand-held GPS unit

Fauna was encountered during clearance works undertaken during the reporting period, including species of birds, mammals and reptiles. Threatened species under the TCS Act and/or the EPBC Act were also encountered.

The following threatened fauna species were encountered during the reporting period clearing works:

- Grey-crowned Babbler (Eastern Subspecies) (*Pomatostomus temporalis temporalis*) – listed as Vulnerable under the TSC Act.
- Glossy Black Cockatoo (*Calyptorhynchus lathamii*) – listed as Vulnerable under the TSC Act.
- Rainbow Bee-eater (*Merops ornatus*) – listed as migratory under the EPBC Act.

The following threatened flora species were encountered during the clearing works:

- Coolabah Bertya (*Bertya opposens*) – listed as vulnerable under the TSC Act and EPBC Act.
- *Tylophora linearis* – listed as vulnerable under the TCS Act and endangered under the EPBC Act.

Clearance works where threatened flora species were identified were relocated to avoid impact (in the case of the *Tylophora linearis*) or relocated to minimise impacts (in the case of Coolabah Bertya).

6.5.3 Proposed Improvement Measures

- Continual weed control works onsite and in the offset areas for Green Cestrum, Coolatai Grass, Box Thorns and other weeds.
- Quarterly weed inspections that will identify the spatial location of weeds, determine status (Weeds of National Significance, noxious and /or environmental), size of infestation and priority for control.
- Quarterly seed inspection programs of both onsite and offset areas including groundcover, shrub and canopy species to reflect seasonal conditions and growth stages of plants with seed collection also occurring at these times if available.
- Quarterly feral animal monitoring program to be modified during the next reporting period into a quarterly feral animal control program, e.g. the VPMP, as required with monitoring continued to be undertaken but focusing on reviewing the success and outcomes of the works undertaken. Feral animal monitoring will be reviewed annually to inform the resourcing and control program to be implemented.
- Review the monitoring requirements in the BOS.

6.6 ABORIGINAL CULTURAL HERITAGE

6.6.1 Environmental Management

Aboriginal Cultural Heritage is managed in accordance with the Aboriginal Cultural Heritage Management Plan (ACHMP), which was prepared to satisfy Schedule 4, Condition 23, and the Statement of Commitments (SoC) detailed in the PA 08_0144. The ACHMP was submitted for review to the Registered Aboriginal Parties (RAPs), OEH and DP&E during the reporting period however, it is yet to be finalised.

6.6.2 Environmental Performance

Soil Disturbance Monitoring

As required by the ACHMP, any soil disturbance work within 100m of a drainage line or in areas not already cleared for agriculture requires the presence of the RAPs to ensure no sites/objects of Aboriginal Cultural Heritage origin are disturbed by clearing activities. The mine has extended this to include all soil disturbance work until the ACHMP and site induction material are updated.

Archaeological Salvage Program

No sites were identified as requiring salvage during the reporting period.

Ongoing Consultation

Narrabri Mine maintains contact with representative of the RAPs in order to ensure appropriate engagement with the Aboriginal community prior to surface disturbance activity. This will continue throughout the life of the operation.

The ACHMP and the Extraction Plan – Heritage Management Plan (EP-HMP) were also provided to the RAPs for comment during the reporting period with an aim to finalise these plans during the next reporting period.

Previously Unidentified Sites

As part of the Narrabri Mine disturbance activities, an area being surveyed by the RAPs for drill pads identified potential cultural heritage sites. Specialists Archaeologists conducted a detailed site

investigation, which concluded that three of the five sites identified were of Aboriginal Cultural Heritage origin. As such, these areas are managed in accordance with the provisions of the ACHMP.

Aboriginal Cultural Heritage Environmental Event

During the reporting period on 4 June 2015 a site identified as Aboriginal Cultural Heritage site was accessed without authorisation. The fence demarcating the site was cut to allow access for a crane to place a pump next to a creek. The event was reported to the RAPs and DP&E. All controls required by the ACHMP were in place. A site inspection by the RAPs and DP&E confirmed no artefacts were damaged by the unauthorised access. Appropriate disciplinary action was taken and no regulatory action was taken by DP&E.

6.6.3 Proposed Improvement Measures

During the next reporting period the mine will undertake a review of the subsidence impacts to identified sites over the first four longwall panels now that mining is complete. The results and recommendations of this report, including feedback from the RAPs, will be used to update the EP-HMP, if required.

During the next reporting period, all identified sites on mine-owned land will be fenced as per the requirements of the ACHMP.

6.7 HISTORIC HERITAGE

There are no items of historic heritage identified in the mining area and hence no specific management measures are required.

6.8 TRANSPORT

6.8.1 Environmental Management

Traffic impacts associated with the Narrabri Mine are managed in accordance with Schedule 4, Conditions 25 to 27 of the PA 08_0144.

6.8.2 Environmental Performance

Greylands Road, which traverses the mining area, has been closed to the public as approved by Narrabri Shire Council (NSC) through the implementation of the Greylands Road Management Plan (GRMP). The mine has applied to buy the portions of Greylands Road that traverse the mining area and while this has progressed significantly during the reporting period it will be finalised during the next reporting period. Inspections of the road are undertaken during active subsidence as required by the Extraction Plan. Scratch Road, in the western portion of the mining lease, has not been utilised to construct mining related infrastructure and as such no agreement has been developed with NSC for the use of this road.

The mine constructed the intersection to the mine in consultation with both NSC and Roads and Maritime Services (RMS). During the next reporting period the mine will consult with the NSC and RMS with the aim of developing an agreement to maintain this intersection.

6.8.3 Proposed Improvement Measures

Develop an agreement for the maintenance of the intersection as described above.

6.9 WASTE MANAGEMENT

Narrabri Mine aims to implement all reasonable and feasible measures to minimise waste and ensure it is appropriately stored, handled and disposed. Waste Materials at the mine are managed in accordance with:

- Schedule 4, Condition 33 of PA 08_0144;
- the Narrabri Mine Waste Management Plan (WasteMP) prepared to satisfy the requirements of PA 08_0144;
- the Pollution Incident Response Management Plan (PIRMP); and
- the legal and strategic framework for managing wastes in NSW.

Narrabri Mine waste streams include general waste, underground waste, oil & greases, recyclables (steel and paper/cardboard), drill cuttings and effluent.

6.9.1 Environmental Performance

Waste Streams

Inspections of waste management practices are carried out to ensure general, hydrocarbon and recyclable waste is segregated. Additional segregation of general waste occurs at the licenced contractor's facility to ensure the maximum amount of material can be recycled. Data on waste streams are collated using information provided by the licenced contractors. During the reporting period waste output increased with operational hours, workforce and mining fleet.

A total of approximately 1,030 tonnes (t) of general waste was removed during the reporting period of which approximately two-thirds was transported to the licenced contractors facility for further segregation. Approximately 14 tonnes of cardboard/paper and 83 tonnes of steel were recycled during the reporting period. The volumes identified above are similar to the previous reporting period indicating the volume of wastes generated at the mine during full production. Approximately 18,000 L of used oils were collected and recycled during the reporting period by an authorised contractor, which is similar to the previous reporting period.

Effluent from the sewage and ablutions facilities at the mine is managed through a Sewage Treatment Plant (STP) with a Continuous Extended Aeration Process. The plant is made up of a series of industrial plastic tanks. Each tank provides a separate function in order to treat the sewage for the required quality and quantity. The system processed on average 35,000 L per day during the reporting period.

Drilling cuttings from exploration, gas drainage and service borehole drilling activities is excavated from sumps and disposed of in the REA or consolidated with excavated soil to backfill the sump (where minor amounts of cuttings are present). An area at the REA has been established to allow excess water from the drill cuttings to decant off and then the cuttings are added to the REA to help consolidate material when emplacing reject from the CHPP.

No incidents relating to waste management practices occurred during the reporting period.

6.9.2 Proposed Improvement Measures

Narrabri Mine will continue to monitor wastes on a regular basis to effectively manage waste generated by the operation and maximise recycling efficiencies.

6.10 HAZARDOUS MATERIALS

6.10.1 Environmental Management

Hazardous materials at the Narrabri Mine are managed and disposed of in accordance with the WasteMP, PIRMP and the relevant Australian standards.

6.10.2 Environmental Performance

Hydrocarbons

No reportable or significant incidents involving fuel storage, handling or delivery occurred during the reporting period. Minor leaks and spills associated with plant maintenance and operation were managed on site.

Explosives

No environmental incidents involving explosives handling or storage occurred during the reporting period.

Other Materials

Minor amounts of soil material impacted by minor spills in the operational areas were removed and are stored in the bio-remediation area prior to treatment. No reportable incidents involving the handling or storage of other potentially hazardous materials occurred during the reporting period.

6.10.3 Proposed Improvement Measures

Ongoing maintenance of the bio-remediation area will ensure a sufficient amount of area is available to store potentially impacted soil material onsite for treatment/disposal.

6.11 VISUAL & LIGHTING

6.11.1 Environmental Management

Visual amenity and lighting impacts associated with the Narrabri Mine are managed in accordance with Schedule 4, Conditions 28 and 29 of the PA 08_0144. Various onsite measures have been implemented during previous reporting periods to mitigate visual impacts of the mine including (but not limited to):

- Construction of an amenity bund on the southern and western boundaries of the site to obscure views from the south and west;
- The train load-out bin, CHPP, secondary crusher and rotary breaker buildings are manufactured from a green ColorBond® type sheeting;
- use of directional lighting in lieu of general area lighting;
- consideration of fixed versus mobile lighting, locations and orientation;
- fixed lighting designed and procured in accordance with Australian Standard (AS) 4282 – 1997: *Control of Obtrusive Effects of Outdoor Lighting* (AS4282); and
- visual lighting inspections as required.

6.11.2 Environmental Performance

One complaint was received during the reporting period due to lighting impacts from the mine, refer to Section 9.3.

6.11.3 Proposed Improvement Measures

Management measures described above will continue to be implemented during the next reporting period.

6.12 BUSHFIRE

6.12.1 Environmental Management

Bushfire hazards and risks associated with the Narrabri Mine are managed in accordance with Schedule 5, Condition 4 of PA 08_0144, i.e. the Rehabilitation Management Plan (RMP) that forms part of the Landscape Management Plan (LMP). Various treatments have been implemented during the reporting period and previous periods to manage and control potential bushfire risks including:

- development and implementation of a Bushfire Prevention Standard and a Bushfire Emergency Response Procedure;
- participation by Narrabri Mine personnel in the Narrabri Rural Bushfire Brigade meetings;
- implementation of various bushfire hazard controls, including Hot Work areas/permits, the mine is a non-smoking site and maintenance of equipment/infrastructure;
- monitoring of fuel loads occurred in the Narrabri Mine offset area known as 'Kenna'; and
- maintenance of the roads and tracks within the Narrabri Mine ML was undertaken prior to the bushfire season. Roads and tracks can act as firebreaks and help to facilitate access across the site.

6.12.2 Environmental Performance

No bushfires occurred adjacent to or within the Narrabri Mine ML 1609 area during the reporting period.

6.12.3 Proposed Improvement Measures

Management measures described above will continue to be implemented during the next reporting period being fuel load assessment, maintenance of access tracks, hot work permits and equipment/infrastructure maintenance.

6.13 MINE SUBSIDENCE

6.13.1 Environmental Management

During the reporting period mining in LW104 was completed during August 2015 and mining in LW105 had retreated 2,373m out of 2,961m. The extraction height averaged 4.3 m and the depth of cover ranged between 195m and 230m.

6.13.1.1 Subsidence Monitoring

Subsidence monitoring was conducted in accordance with approved Extraction Plan and Subsidence Management Plan (SMP) 10/9000 for longwall panels LW101 to LW105.

6.13.2 Environmental Performance

Electricity Transmission Lines

The 11kV power line that traverses LW101 to LW105 was decommissioned during the reporting period. The power line conductors and poles were removed during January 2016. Essential Energy approved this work and as such, the Essential Energy Management Plan and its monitoring requirements are no longer in effect.

Telecommunications Infrastructure

No telecommunications infrastructure exists within the Extraction Plan area for LW101 to LW105.

Public Roads

There is one public road within the mining area, known as Greylands Road, which was undermined during the reporting period. The road is permanently closed to the public in accordance with the requirements of the Greylands Road Management Plan (GRMP). Repairs required for traffic-ability for mine personnel were undertaken as required. Narrabri Mine has applied to NSW Crown Lands to purchase the section of the road that traverses the mining lease.

Land Surface

Ponding occurred in LW105 during the reporting period however at the end of the period the ponding areas were dry due to the hot dry weather experienced at the site over summer. Ploughing over LW102 and LW103 was undertaken during the reporting period with no ploughing occurring over LW104 and LW105. No seeding of the subsidence area was undertaken during the reporting period as the soil conditions were too dry.

Buildings and Other Structures

No buildings or sheds were undermined during the reporting period.

Water Storage Dams and Contour Banks

Various small farm dams and contour banks were undermined during the reporting period. Subsidence has not impacted on the function of the dams and should remediation works be required to the contour banks, Narrabri Mine will either reinstate them or remove a section to avoid water ponding.

Fences and gates

Various fences and gates were undermined during the reporting period. Narrabri Mine has excluded all stock from the active mining area by erecting a fence outside of the subsidence zone to the east of LW101. Any fences/gates required post-mining will be re-instated.

Mine Infrastructure

Pipelines connecting gas drainage wells were undermined during the reporting period however no impacts were recorded on this infrastructure. All gas drainage infrastructure in the active mining area is inspected and maintained to ensure subsidence does not adversely impact this equipment. Narrabri Mine also decommissions gas drainage infrastructure when it is no longer required.

The Personal Emergency Device (PED) cable was undermined during the reporting period with no impacts recorded.

6.13.2.1 Comparison against Predictions

Table 16 outlines the predicted subsidence and the measured subsidence parameters at the end of the reporting period. For more details on the subsidence monitoring lines refer to the Whitehaven Coal website and the End of Panel Report for LW104.

Table 16: Subsidence Parameters – Predicted and Measured

Monitoring Line	Type	Maximum Total Subsidence (m)	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)
LW104 South	Observed	2.614	30.3	7.5	6.1
	Predicted	2.75	34	16	40
LW105 North	Observed	2.543	45.8	17.7	44.6
	Predicted	2.75	30	13	34

Based on **Table 16**, subsidence prediction exceedances did occur during the reporting period. The results are summarised below:

- The maximum subsidence measurements for LW104 South and LW105 North monitoring lines were within the predicted range.
- The maximum tilt measurements were within the predicted range for LW104 South monitoring line. 92% of the measured tilts in LW105 North monitoring line were within the predicted range.
- The maximum tensile strain measurements were within the predicted range for LW104 South monitoring line. 96% of the measured tensile strain values in LW105 North monitoring line were within the predicted range.
- The maximum compressive strain measurements were within the predicted range for LW104 South monitoring line. LW105 North monitoring line recorded a maximum compressive strain of 44.6 mm/m. However, 98% of the measured compressive strains were within the predicted range.

The centreline subsidence results indicate that the Garrawilla Volcanics and Basalt Sill have not reduced subsidence through spanning behaviour. The maximum subsidence is also considered closer to 63% of the average mining height of 4.3m. The subsidence predictions were updated during the reporting period as part of the Environmental Assessment undertaken for Modification 5.

6.13.2.2 Incidents

No mine emergency response procedures were activated because of subsidence during the reporting period.

6.13.3 Proposed Improvement Measures

Ploughing and seeding of longwall areas will be undertaken when soil moisture conditions improve. Narrabri Mine has developed a Ponding Management Plan, which was submitted for consultation during the reporting period.

6.14 PUBLIC SAFETY

6.14.1 Environmental Management

The Narrabri Mine Pit Top Area and drilling operations are all located wholly on mine owned land and is appropriately signed allowing authorised access only. The site is visible from the Kamilaroi Highway and accessible via an access road from the Highway across the main northern railway line. Narrabri Mine has applied to purchase Greylands Road and it is closed to the public. Once the mine takes possession of Greylands Road it will be closed permanently. All access is directed through the Pit

Top Area. Visitors to the mine are required to report to the mine office and unauthorised personnel are not permitted to move around the mine area unaccompanied.

As required by the Extraction Plan for second workings (i.e. longwall mining), Narrabri Mine has developed a Public Safety Management Plan (PSMP) that outlines the management of subsidence on public infrastructure overlying LW101 to LW105.

6.14.2 Environmental Performance

As required by the PSMP, the mine developed and implemented two infrastructure management plans, being the Greylands Road Management Plan (GRMP) and the Essential Energy Management Plan (EEMP). As noted above, the GRMP is still in effect, the road is closed to the public, and the EEMP is no longer in effect, as the power line has been removed. No other public infrastructure exists within LW101 to LW105, i.e. the approved Extraction Plan area.

The procedures in place have been effective throughout the reporting period to prevent unauthorised access to the mine site by the general public. However, anti-coal activists have bypassed locked gates, fences and ignored mine area safety signage to access areas of the mine.

6.14.3 Proposed Improvement Measures

As there have been no incidents relating to general public safety, Narrabri Mine is not proposing to implement any additional improvement measures.

7 WATER MANAGEMENT

7.1 WATER SUPPLY

A pipeline from the Namoi River is the main source of raw water supply for the Narrabri Mine. **Table 17** summarises the water taken by the mine during the 2014/2015 financial year.

Table 17: Narrabri Mine Water Take

Water Licence #	Water Sharing Plan	Water Source and Management Zone	Entitlement	Passive Take / Inflows	Active Pumping by Narrabri Mine	Total
WAL 12833	Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source	134	0	134	134
WAL 20131	Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source	300	0	107	107
WAL15922	NSW Great Artesian Basin Groundwater Source	Southern Recharge Groundwater Source	322.4	0	0	0
WAL 29549	NSW Murray Darling Basin Porous Rock Groundwater Sources	Gunnedah – Oxley Basin MDB Groundwater Source	1,022.5	0	442	442
WAL 2671	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	60	0	0	0
WAL 6762	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	20	0	0	0
WAL 2728	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	12.5	0	0	0
WAL 20152	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	750	0	28	28

7.2 SURFACE WATER MANAGEMENT

7.2.1 Environmental Management

The Narrabri Mine water management system aims to ensure there are no adverse impacts on receiving water quality, to allow for early detection of any potential impacts and develop appropriate corrective actions. Potential impacts to surface water quality are managed in accordance with:

- Schedule 4, Conditions 10 to 17 of PA 08_0144;
- EPL 12789 Conditions P1, L1, L2 and M2; and
- the Narrabri Mine Water Management Plan (WMP) and the Extraction Plan – Water Management Plan (EP–WMP) prepared to satisfy the requirements of PA 08_0144.

During the reporting period various controls strategies were implemented to manage surface water quality including:

- Separation of clean water, i.e. surface water runoff where water quality is not affected by mining operations, by using diversion drains/contour banks;
- Collection of water from disturbed areas in sediment control dams, i.e. SD1-SD6;
- Containment of water potentially affected by coal or other substances, e.g. hydrocarbons, either from the underground operation or as runoff from the surface facilities/coal processing area, i.e. SB1-SB4;
- The use of appropriate erosion and sediment controls, including silt fences, rock checks and other measures as required;
- no uncontrolled discharge of mine water off-site;
- maintaining an up-to-date water balance to ensure on-site water demands are satisfied whilst minimising offsite water impacts; and
- regular sampling and inspections of the onsite and surrounding surface water system.

Surface water monitoring locations are illustrated on Figure 2. A summary of the surface water quality findings from the reporting period is provided below.

7.2.2 Environmental Performance

Surface Water Quality

Routine surface water monitoring is conducted around the site with surrounding ephemeral creeks sampled when flowing for pH, Electrical Conductivity (EC), Oil & Grease (O&G) and Total Suspended Solids (TSS). These creeks were sampled on seven occasions during the reporting period. The laboratory results for pH, EC and TSS, including trends, are detailed in Appendix D as required by the WMP. Generally, all results are within the designated range or trends are difficult to determine given the range of variability on the results including both upstream and downstream samples

No non-compliances relevant to surface water management were recorded during the reporting period. Surface water EC, pH and TSS trends for the EPL licenced discharge locations, i.e. SD2, SD4 and SD5, are provided in Appendix D as required by the WMP.

Onsite Water Quality

Narrabri Mine monitors 'saline water' defined in the WMP as water pumped from the underground workings. The water quality sampling of any 'saline water' conducted during the reporting period has been characterised as coal contact water and all results are shown in Appendix D as required by the WMP, refer to results for the 'Box Cut' sampling location. All saline water is contained onsite and either processed via a Water Conditioning Plant (WCP) or reused in operational areas of the mine. The subsequent brine produced from the WCP is stored in lined dams within the rail loop.

Wet Weather Discharge Monitoring

No wet weather discharge monitoring was undertaken during the reporting period as no discharges occurred from licenced points SD2, SD4 and SD5.

Subsidence Surface Water Impacts

Refer to Sections 6.5.2 and 6.13.2.

7.2.3 Proposed Improvement Measures

The surface water monitoring program and management measures described above will continue to be implemented during the next reporting period consistent with the approved WMP. During the next reporting period, an additional dam will be lined for brine water storage and the WCP will be upgraded to facilitate the predicted groundwater inflows into the mine.

7.3 GROUNDWATER

7.3.1 Environmental Management

Groundwater at the Narrabri Mine is managed in accordance with the WMP prepared to satisfy the requirements of the PA 08_0144.

Currently groundwater monitoring is conducted at sites located within and surrounding the mine as illustrated on Figure 2 and as outlined in **Table 18**.

Table 18: Groundwater Monitoring Summary

Location	Parameters	Frequency
All Standpipes P1,P2, P3, P4, P5, P6,P7,P8, P9, P10, P11,P12, P13, P14, P15, P16,P17,P18, P19, P20, P28, P29, P30, P31, P32, P33, P34, P47, P50, P51, P52, P53, WB1, WB2, WB3a, WB3b, WB4, WB5a, WB5b, WB6a, WB6b, WB7 and WB8	Water level EC pH TDS Metals Anions and Cations	Quarterly (water level, pH and EC) Bi-annually (full water quality)
Vibrating Wire Piezometers P21,P22, P25 ,P26, P27 and P48	Water Level	Daily (Data Logger)
Multi-Level Vibrating Wire Piezometers P23, P24, P35, P36, P37, P38, P40, P44, P45 and P46	Water Level	Daily (Data Logger)
Mine water pumped into and out of the mine	EC pH TDS Metals Anion and Cations Discharge Rate	Daily (flow rate) Monthly (full water quality)

7.3.2 Environmental Performance

There were four non-compliances recorded for groundwater management during the reporting period, refer to **Table 2**. All bores show trends / characteristics that are within the historic range or as predicted in the latest Groundwater Assessment (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015) prepared for the Environmental Assessment undertaken to support Modification 5 of PA 08_0144. Parameters recorded as part of the scheduled groundwater monitoring for this reporting period are summarised below and additional results provided in Appendix E as required by the WMP.

Water Quality Results

A review of the data presented in Appendix E (as required by the WMP) indicates that groundwater quality has remained relatively consistent throughout the reporting period. At the end of the reporting

period eleven groundwater monitoring wells recorded concentrations of parameters above the ANZECC Water Quality Guidelines for Stock Drinking Water (*Australian and New Zealand Environment and Conservation Council (ANZECC), Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000*).

The majority of the exceedances related to total dissolved solids and are indicative of background levels in certain geological formations, e.g. the Napperby, Pamboola and Purlawaugh geological units, and some of these bores, e.g. P5, are far removed from the active mining area, indicating that the results are unlikely the result of mining operations. Other exceedances, e.g. sulphate recorded in P3, are unlikely to be attributable to mining operations as this bore is over 4km from the active mining area. The EC levels in all bores are relatively stable with the recorded levels within historic groundwater EC ranges.

As outlined in the Trigger Action Response Plan (TARP) included in the approved WMP, if the water quality is impacted by operations an investigation will be undertaken. However, as the exceedances outlined above are occurring in monitoring bores away from active mining areas and are considered indicative of natural variability and background concentrations in the groundwater quality surrounding the site, Narrabri Mine will continue to monitor the levels and review following subsequent sampling events and report through future Annual Reviews as required by the TARP.

Vibrating Wire Piezometers

The results from the groundwater model recalibration (Draft Groundwater Data Analysis and Model Recalibration Report, Heritage Computing 2015), submitted for consultation during the reporting period, and the Modification 5 Groundwater Assessment (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015), indicate that the model developed for the original EA performs well in representing the values and patterns of the groundwater levels for both steady state and transient conditions. Additionally, the life-of-mine vibrating wire piezometers (VWPs) installed to date, i.e. P40, P44, P45 and P46, refer to Appendix E, show signs of mining effects as predicted in the Modification 5 Groundwater Assessment (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015). It is noted in the report that some of the drawdowns recorded in the VWPs in the shallower aquifers can be attributed to: pumping activity associated with unlicensed bores; VWPs not reaching equilibrium; and/or a mismatch in the timing of mining development.

Groundwater Inflows

As part of the Environmental Assessment for the Narrabri Mine Modification 5, the Groundwater Assessment was updated (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015). The updated assessment estimated the rate of groundwater inflows and was validated against recent data. As mining progresses, groundwater inflows are predicted to increase as the mine continues west, peaking at approximately 3.77 ML/day in 2023 and then decreasing as the mine progresses back to the east.

Groundwater inflows into the underground and dewatering ahead of mining for the reporting period totalled approximately 451ML, with a modelled prediction for the 2015 calendar year of 588ML. It should also be noted that the mine has consulted with DPI-Water during the reporting period and have agreed that a calculation can be used to determine the amount of recycled water from the operation, making the total take for the reporting period approximately 265ML.

7.3.1 Proposed Improvement Measures

The groundwater model recalibration (Draft Groundwater Data Analysis and Model Recalibration Report, Heritage Computing 2015), which was provided for consultation during the reporting period, will be finalised during the next reporting period. In addition, as required by PA 08_0144, the brine water management review will also be submitted for agency review during the next reporting period. Groundwater monitoring program and management measures described above will continue to be implemented during the next reporting period.

An annual review of the groundwater data by a qualified hydrogeologist will be undertaken for the next Annual Review period. Although this has not occurred for this reporting period both the Groundwater Assessment for Modification 5 (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015) and groundwater model recalibration (Draft Groundwater Data Analysis and Model Recalibration Report, Heritage Computing 2015) were undertaken during the reporting period.

7.4 SITE WATER BALANCE

Table 19 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 19: Stored Water

	Volumes Held (m ³)		Available Storage Capacity at the end of the Reporting Period (m ³)
	Start of Reporting Period	At end of Reporting Period	
Clean Water (in Storage Dams)	16,225	10,460	96,340
Dirty Water (in Sediment Basins)	8,280	3,850	67,150
Evaporation Ponds*	379,348	413,216	319,484
* = Additional 40ML of storage in containment bund in rail loop.			
Note: 1m ³ = 1,000L			

As noted above, approximately 265ML was dewatered from the mine. In addition, approximately 269ML was transferred from the Namoi River and Namoi Bore licenses for the mine. This indicates that the mine is still in water deficit. The revised Groundwater Assessment (Narrabri Mine Modification Groundwater Assessment, Heritage Computing 2015) predicts that the mine will be in water surplus, i.e. is producing more water than it requires for operation, around 2018. The mine water management system is shown in Figure 5 (Modification 5 Surface Water Assessment, WRM 2015).

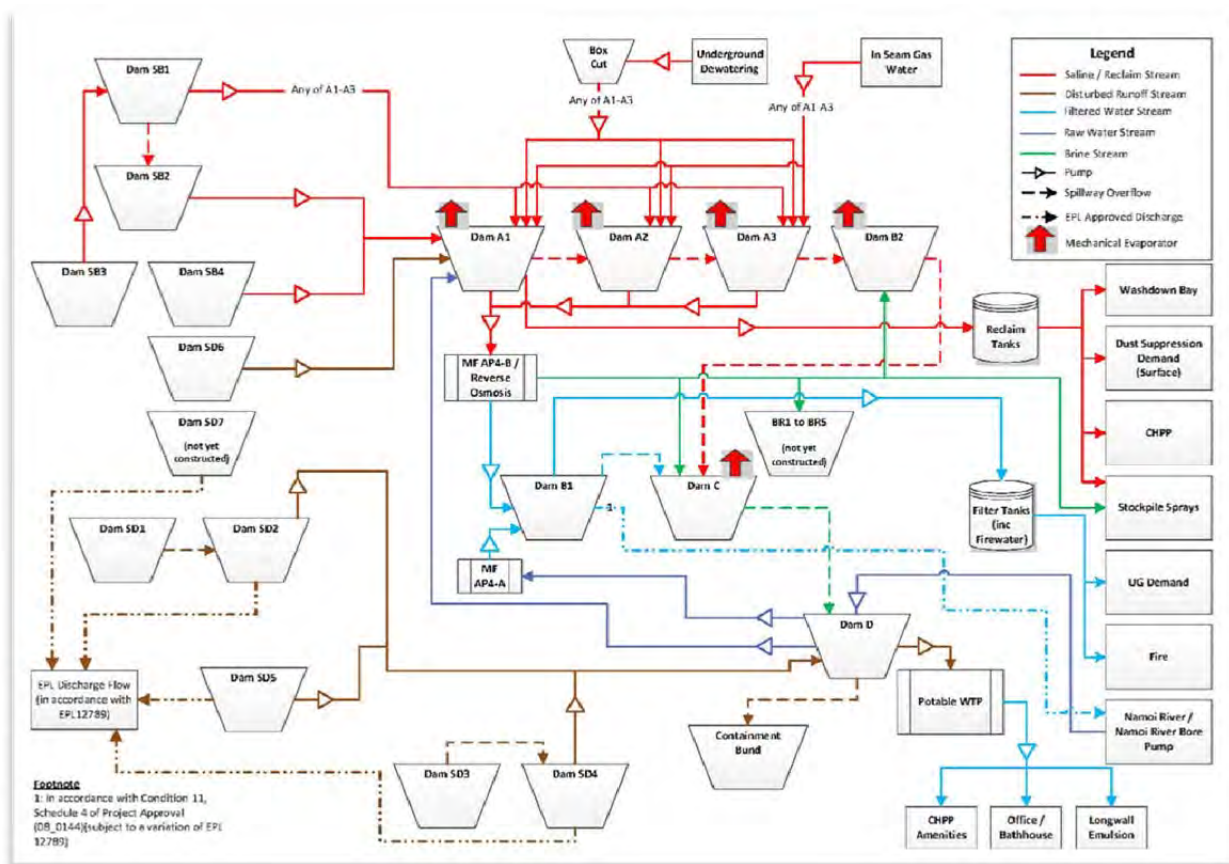


Figure 5: Water Management System Schematic

8 REHABILITATION

The rehabilitation objectives for the Narrabri Mine are described in Schedule 5, Conditions 1 to 4 of PA 08_0144. The MOP summarises the key elements for rehabilitation as well as providing a description of activities and mine landforms.

8.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

8.1.1 Status of Mining and Rehabilitation

The majority of cover crop establishment occurred during previous reporting periods in LW101 to LW102 and weather conditions were unfavourable to seed cover crops over LW103 to LW105. Rehabilitation activities during this reporting period were therefore limited to filling in sumps associated with drilling activities and re-spreading topsoil/subsoil over drilling/access tracks, refer to Plans 3 to 5 and **Table 20**, below.

8.1.2 Post Rehabilitation Land Uses

The rehabilitation completion criteria will be consistent with the description in the Landscape Management Plan. The area in the west of ML 1609 will be returned to native woodland and the area in the east of the ML will be returned to the relevant land capability class.

8.1.3 Rehabilitation Performance Indicators

Table 20 summarises the rehabilitation status for the Narrabri Mine, also refer to Plans 3 to 5.

Table 20: Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period 2016 (Forecast)
A. Total mine footprint	153	187	225
B. Total active disturbance	56	89	128
C. Land being prepared for rehabilitation	0	0	0
D. Land under active rehabilitation	97	109	121
E. Completed rehabilitation	0	4	4

8.1.4 Decommissioning and Demolition Activities

No decommissioning activities were undertaken during the reporting period outside of the reclaiming of gas drainage infrastructure, which is re-used where possible. Houses on mine-owned land that are no longer required or that have been affected by subsidence will be decommissioned during the next reporting period. Any decommissioning works will be undertaken in accordance with the relevant standards and NSC approvals.

8.1.5 Other Rehabilitation Activities

Rehabilitation activities associated with exploration activities have been undertaken during the reporting period. Where possible, exploration holes are located on previously disturbed land or in areas that will be required for the operation in the future. The extent of clearing is restricted to the

practical minimum area for each drill pad/access track and rehabilitated following completion if not required for the operation at a later date.

8.1.6 Departmental Sign-off of Rehabilitated Areas

Departmental sign-off has not been requested.

8.1.7 Variations in Activities against MOP/RMP

A MOP amendment was approved during the reporting period following the approval of PA 08_0144 Modification 4, which allowed for an extension of the ROM and product coal stockpiles.

There were no other variations in activities undertaken at the mine to those proposed in the MOP.

8.1.8 Monitoring

Internal rehabilitation/revegetation monitoring undertaken to date has primarily been limited to inspections of roads/creeks impacted by subsidence, water management structures, soil stockpiles and seeded areas for evidence of instability/erosion or poor germination and borehole sealing. This process will continue over the life of the mine, with the extent and nature of activities undertaken being consistent with the relevant MOP, Extraction Plan, Landscape Management Plan and other relevant management plans prepared in satisfaction of PA 08_0144.

8.1.9 Trials, Research Projects and Initiatives

No rehabilitation trials or research were undertaken during the reporting period.

8.1.10 Key Issues to Achieving Successful Rehabilitation

The key issues to achieving successful rehabilitation include:

- Poor quality or lack of volume of topsoil;
- Loss or alteration to existing habitats due to subsidence, erosion, weeds and/or pests;
- Alteration of drainage lines due to subsidence;
- Contaminated land occurring onsite;
- Ongoing greenhouse gas emissions due to inadequate sealing of mine entries etc;
- Loss of agricultural resources due to mining disturbance; and
- Discharge of saline or contaminated water.

In cases where the performance is sub-optimal, additional management measures will be implemented (e.g. replanting, repairing landform and water management features, application of much/fertilisers, feral animal and weed control etc.).

8.1.11 Actions for the next reporting period

The rehabilitation actions for the next reporting period are detailed in the approved MOP, which covers the period to December 2017.

Rehabilitation of the REA is planned to commence during the next reporting period. A new MOP, to be submitted during the next reporting period, will determine the rehabilitation methodology for the REA, once approved by DRE.

8.1.12 Proposed Research and Rehabilitation for 2016

No rehabilitation research activities are planned during the next reporting period on the mine site.

9 COMMUNITY

Social impacts and opportunities associated with the Narrabri Mine are managed in accordance with PA 08_0144 and the SoC (Appendix 3 of PA 08_0144).

9.1 COMMUNITY ENGAGEMENT ACTIVITIES

In accordance with Schedule 6, Condition 9 of PA 08_0144, a Community Consultative Committee (CCC) has been formed and operating since 2008. The committee comprises representatives of NSC, Narrabri Mine and the community. Since its inception, the CCC has met on a regular basis, meeting 4 times per year in accordance with the condition of consent. During the reporting period, meetings were held on 10 June 2015, 16 September 2015, 16 December 2015 and 16 March 2016.

Narrabri Mine representatives continue to maintain contact with neighbours near the mine site. These contacts not only provide a means of information dissemination, but also enable Narrabri Mine to ascertain and address any potential issues, which may arise from time to time. A newsletter is also produced annually to update the surrounding area on the progress of the mine. In addition, information relating to the mine is available: on the Whitehaven website; via the complaints hotline; as part of sponsorship of local community events and groups; and at meetings as required with neighbours and a range of stakeholders including government and non-government agencies.

9.2 COMMUNITY CONTRIBUTIONS & INITIATIVES

As well as attending functions, WHC and Narrabri Mine also contributed to the community by providing over \$94,000 in financial support and sponsorship to various community events and initiatives throughout the community.

9.3 COMMUNITY COMPLAINTS

Narrabri Mine maintains a designated complaints line, with messages checked on a daily basis by site personnel. In the event of a complaint, details pertaining to the complainant, complaint and action taken are recorded on the complaints register.

During the reporting period, 21 complaints were made to the mine. Twelve of these complaints were received via the designated complaints line. A summary of the complaints (by category) received during the reporting period are detailed in **Table 21**. The Complaints Register is also available on the Whitehaven website.

Table 21: Summary of Community Complaints and Enquiries

Category	Reporting Period
Air Quality	6
Traffic	0
Surface Water	0
Visual Amenity	1
Noise / Vibration	15
Other	0
TOTAL	22

Note a single complaint may involve multiple categories

9.3.1 Complaint Trends

The total number of complaints received during the reporting period almost halved from the previous year. The decrease in the number of complaints can be attributed to the mine's continual improvement in managing the operation, in particular air quality issues, which accounted for 30 complaints during the previous reporting period.

9.3.2 Actions & Proposed Improvements

Community complaints primarily related to air quality and noise concerns. Actions taken in response to complaints included a range of measures not limited to the following:

- Investigations into specific mining activities;
- Reviewing video footage or visual media where available;
- Reviewing real time monitoring data and operational activities;
- Analysis of meteorological data;
- Communicating learnings and issues to operational personnel; and
- Community Consultation.

Proposed improvements for the next reporting period in relation to noise include those items identified in Section 12.

10 INDEPENDENT AUDIT

10.1 INDEPENDENT ENVIRONMENTAL AUDIT

No Independent Environmental Audit (IEA) was undertaken of the Narrabri Mine during the reporting period. The most recent IEA was undertaken in 2013 and a summary of actions and how they are being addressed are included in **Table 22** below. In accordance with Schedule 6, Condition 7 of PA 08_0144 the next IEA will be commissioned by 13 September 2016.

Table 22: 2013 Independent Audit – Outstanding Actions

Condition/Plan	Proposed Action	Status
PA 08_0144 Schedule 4, Condition 25 The Proponent shall maintain the Mine Access Road Intersection with Kurrajong Creek Road and the Kamilaroi Highway in consultation with NSC and to the satisfaction of RMS.	Agree to maintenance program with NSC/RMS	By 31 December 2016
PA 08_0144 Schedule 6, Condition 2 The Proponent shall ensure that the management plans required under this approval are prepared in accordance with any relevant guidelines, and include: (h) a protocol for periodic review of the plan.	Whitehaven will implement a review process whereby the all reviews are documented.	By 31 December 2016
PA 08_0144 Schedule 6, Condition 3 Within 3 months of the submission of an:... the Proponent shall review, and if necessary revise, the strategies, plans, and programs required under this approval to the satisfaction of the Director-General.	Whitehaven will implement a review process whereby the all reviews are documented.	By 31 December 2016

11 INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 NON-COMPLIANCES

The compliance status of the Narrabri Mine against relevant approvals during the reporting period was assessed in Section 1 as at the end of the reporting period (i.e. 31 March 2016). Further details of any non-compliance and actions undertaken or proposed for the following reporting period is summarised in **Table 23**.

Table 23: Non-Compliance Details and Proposed Action Plan

Non - Compliance	Date / Location	Cause	Action Plan	Due Date
The EP-WMP requires an annual review of groundwater data to be completed by an experienced hydrogeologist, which has not occurred. However, groundwater reviews have been undertaken during the reporting period.	Required for AR reporting period	Reviews were completed but not for the full period	Narrabri Mine will ensure these reviews are undertaken .	31 May 2017, i.e. next AR
An increase of 10% or more in weed cover was recorded in 3 monitoring plots	Spring Monitoring 2015	The combination of disturbance and heavy rainfall in the lead up the spring surveys may have provided good conditions for weeds to germinate.	Continue weed management as per RMP.	Spring 2016, i.e. prior to next monitoring round, but ongoing
Noise exceedances were recorded during the reporting period. The relevant Government agencies were notified at the time as required by the NMP.	During reporting period.	Excessive noise from the mining operation	Additional noise mitigation measures to be implemented, refer to Section 6.3.2.	30 June 2016
Levels in the rail loop water storages will be monitored on a weekly basis and following a storm event with the results recorded on the monitoring database (SoC 7.13).	During reporting period.	Some dams are monitored continuously and others are monitored monthly. Procedural oversight.	Dams levels to be checked weekly.	30 June 2016
The raw monitoring data is published on the mine's website within two weeks of sampling. Monitoring data has not been placed on the website.	During reporting period.	Procedural oversight.	Current groundwater data is now accessible on the website and will be updated following future monitoring rounds.	Complete
The WMP requires an annual review of groundwater data to be completed by an experienced hydrogeologist, which has not occurred. However, groundwater reviews have been undertaken during the reporting period.	Required for AR reporting period	Reviews were completed but not for the full period	Narrabri Mine will ensure these reviews are undertaken.	31 May 2017, i.e. next AR

Non - Compliance	Date / Location	Cause	Action Plan	Due Date
The Wild Dog is the only feral animal species that requires control across the site. The number of baits placed, the number of baits taken and any dead animals observed will be recorded. This will be undertaken for each baiting period as recommended by the local LHPA officer. This will be undertaken for the duration of the mining lease.	During reporting period.	While feral animal control has occurred, wild dogs were not included as the most prolific feral animal onsite is the feral pig.	The mine will develop a formal VPMP, including control for wild dogs. The mine is also required to consider potential impacts to the Superb Parrot and as such, surface ground baiting is not permitted in the onsite BOA.	31 July 2016
The BOS requires a Vertebrate Pest Management Program (VPMP) to be developed. While feral animal control has been undertaken the VPMP has not been developed in consultation with surrounding landholders.	During reporting period.	While feral animal control has been undertaken, a formal VPMP has not been developed in consultation with surrounding landholders.	The mine will develop a formal VPMP, including control for wild dogs, and implement during the next reporting period.	31 July 2016
The BOS requires a BOMP implementation report to be developed.	During reporting period.	While management programs were in place and annual monitoring completed no report was developed for the 2014-2015 period.	An implementation report has been developed for the 2015-2016 period, however the offset areas were approved during the previous period, i.e. August 2014, and no report was developed for the shorter time-frame.	Complete – included in this AR
While the lot and DP are listed on the 'Form A's' provided a plan was not included.	During reporting period.	Oversight	The mine will include a plan showing the information included in the Form A's.	With future submissions of Form A's

11.2 REPORTABLE INCIDENTS OR EXCEEDANCES

Details of reportable monitoring exceedances or incidents are included below:

- Noise exceedances, as detailed in Section 6.1.2, were reported to the EPA and DP&E during the reporting period; and
- An environmental event occurred during the reporting period involving Aboriginal Cultural Heritage that was reported to OEH and DP&E. The event is detailed in Section 6.6.2.

11.3 REGULATORY ACTIONS

The following official cautions or warning letters, penalty notices or prosecution proceedings were issued to Narrabri Mine during the reporting period:

- An official caution letter was received from the EPA during the reporting period. The letter was issued in relation to the mine not determining onsite weather conditions via the onsite weather station as required by EPL 12789. The mine instead follows the procedure outlined in the approved Noise Management Plan (NMP). This will be addressed in the next reporting period with the installation of a temperature inversion tower, a variation to EPL 12879 and a review of the mine's NMP.

12 ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

Activities to be completed in the next reporting period to improve the environmental or community performance of the Narrabri Mine, in addition to those separately identified in Section 11 include:

- Review and revision of various Environmental Management Plans;
- Undertaking an IEA;
- Improvements in noise management as listed in Section 6.1.3;
- Submission of a new MOP; and
- Continued community liaison and engagement with local stakeholders.

NARRABRI MINE
ANNUAL REVIEW 2015-2016
PLANS 3, 4 and 5

NARRABRI MINE

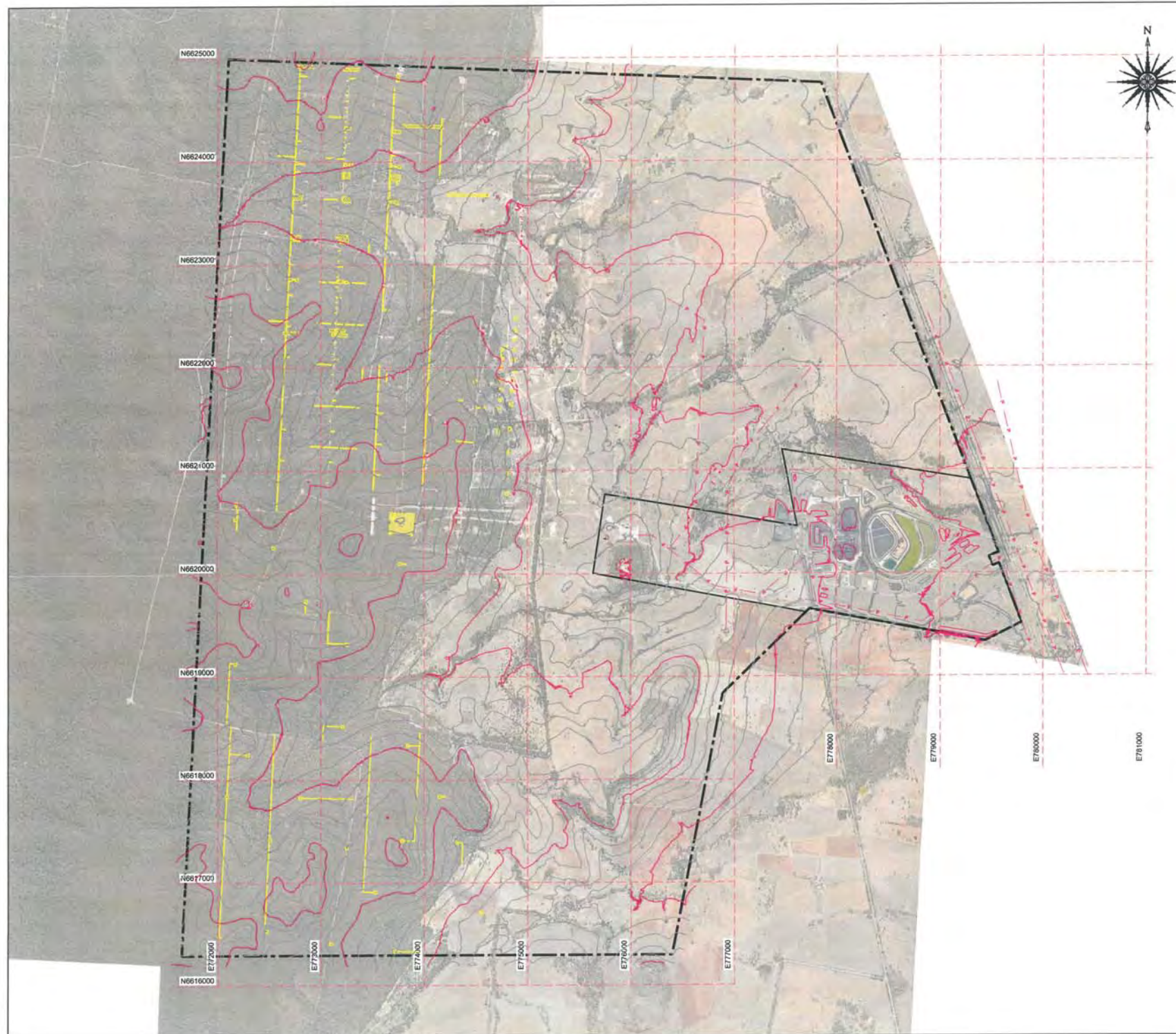


LEGEND

- Soil Stripping Area Prior to this AEMR
- Soil Stripping Area (2015/2016 AEMR)
- Proposed Soil Stripping Area (2016/2017 AEMR)
- Rehab Area Prior to 2014-2015 AEMR. Less then 10 deg slope
- Rehab Area Prior to 2014-2015 AEMR. 10 to 18 deg slope
- Rehab Area Prior to 2014-2015 AEMR. Greater then 18 deg slope
- Rehabed Areas (2014/2015 AEMR) Less the 10 deg slope
- Rehab Area (2013/2014 AEMR) 10 to 18 deg slope
- Rehab in progress area (Prior To This AEMR)
- Proposed Rehab Area (2016-2017 AEMR)
- Rehab Areas in Progress (2015-2016 AEMR)
- Subsoil Stockpile
- Topsoil Stockpile
- 15cm Topsoil Stripping Depth
- 25cm Subsoil Stripping Depth
- Mining Lease Boundary & Colliery Holding Boundary
- Mining Surface Lease
- Power Line
- Minor Contours 5m
- Major Contours 25m

AEMR PLAN 3
2016-2017 PROPOSED
LAND PREPARATION
NARRABRI MINE
SCALE 1:12,500@A0

File Ref	NC_AEMR(2015-16) - Plan 3
Surveyor	Peter Coffey
Signature	
Date	01/06/2016





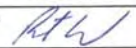
NARRABRI MINE

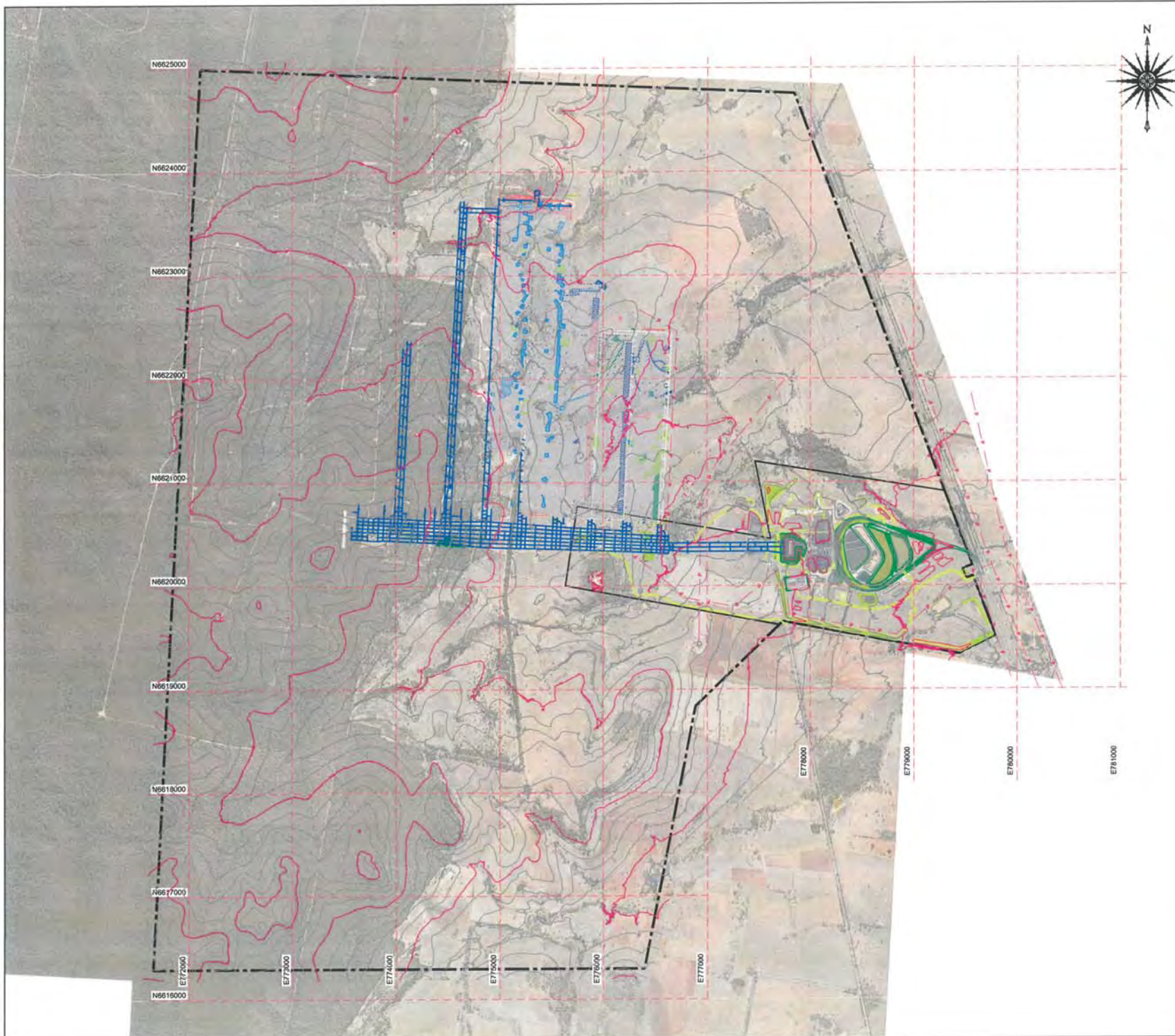


LEGEND

- Soil Stripping Area
Prior to this AEMR
- Soil Stripping Area
(2015/2016 AEMR)
- Proposed Soil Stripping Area
(2016/2017 AEMR)
- Rehab Area Prior to 2014-2015 AEMR.
Less then 10 deg slope
- Rehab Area Prior to 2014-2015 AEMR.
10 to 18 deg slope
- Rehab Area Prior to 2014-2015 AEMR.
Greater then 18 deg slope
- Rehabed Areas (2014/2015
AEMR) Less the 10 deg slope
- Rehab Area (2013/2014 AEMR)
10 to 18 deg slope
- Rehab in progress area
(Prior To This AEMR)
- Proposed Rehab Area
(2016-2017 AEMR)
- Rehab Areas in Progress
(2015-2016 AEMR)
- Subsoil Stockpile
- Topsoil Stockpile
- 15cm** Topsoil Stripping Depth
- 25cm** Subsoil Stripping Depth
- Mining Lease Boundary &
Colliery Holding Boundary
- Mining Surface Lease
- Power Line
- Minor Contours 5m
- Major Contours 25m

AEMR PLAN 4
2015-2016 MINING ACTIVITES
NARRABRI MINE
SCALE : 1:12,500@A0

File Ref:	NC_AEMR(2015-16) - Plan 4
Surveyor:	Peter Coffey
Signature:	
Date:	01/06/2016



NARRABRI MINE



LEGEND

- Soil Stripping Area
Prior to this AEMR
- Soil Stripping Area
(2015/2016 AEMR)
- Proposed Soil Stripping Area
(2016/2017 AEMR)
- Rehab Area Prior to 2014-2015 AEMR.
Less than 10 deg slope
- Rehab Area Prior to 2014-2015 AEMR.
10 to 18 deg slope
- Rehab Area Prior to 2014-2015 AEMR.
Greater than 18 deg slope
- Rehabed Areas (2014/2015
AEMR) Less than 10 deg slope
- Rehab Area (2013/2014 AEMR)
10 to 18 deg slope
- Rehab in progress area
(Prior To This AEMR)
- Proposed Rehab Area
(2016-2017 AEMR)
- Rehab Areas in Progress
(2015-2016 AEMR)
- Subsoil Stockpile
- Topsoil Stockpile
- 15cm Topsoil Stripping Depth
- 25cm Subsoil Stripping Depth
- Mining Lease Boundary &
Colliery Holding Boundary
- Mining Surface Lease
- Power Line
- Minor Contours 5m
- Major Contours 25m

AEMR PLAN 5
CURRENT REHABILITATION &
PROPOSED REHABILITATION 2016-2017
NARRABRI MINE
SCALE : 1:12,500 @ A0

File Ref	NC_AEMR(2015-16) - Plan 5
Surveyor	Peter Coffey
Signature	
Date	01/06/2016

Appendix A – *Flora Species List*

Table A1 Flora Species List Kenna BOA

[illegible]

Family Name	Scientific Name	Common Name	Native	Survey Sites																					
				1	1 Rep	2	2 Rep	3	3 Rep	4	4 Rep	5	5 Rep	6	6 Rep	7	7 Rep	8	8 Rep	9	9 Rep	10	10 Rep	11	11 Rep
Gentianaceae	<i>Centaurium tenuiflorum</i>		No																			x			
Adiantaceae	<i>Cheilanthes distans</i>	Bristly Cloak Fern	Yes			x	x															x		x	
Adiantaceae	<i>Cheilanthes sieberi</i>	Mulga Fern	Yes	x																x	x	x			
Poaceae	<i>Chloris ventricosa</i>	Tall Chloris	Yes	x				x				x			x					x					
Asteraceae	<i>Chondrilla juncea</i>	skelton weed	No						x				x	x			x	x		x					
Asteraceae	<i>Chrysocephalum apiculatum</i>	Common Everlasting	Yes	x																					
Asteraceae	<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	Yes		x		x					x													
Ranunculaceae	<i>Clematis microphylla</i>	Small-leaved Clematis	Yes					x																	
Asteraceae	<i>Conyza bonariensis</i>		No						x								x								
Commelinaceae	<i>Commelina cyanea</i>		Yes						x	x	x														
Poaceae	<i>Cymbopogon refractus</i>	Barbed Wire Grass	Yes	x	x	x	x				x	x				x		x	x	x	x		x	x	x
Poaceae	<i>Cynodon dactylon</i>	Common Couch	No		x				x	x		x	x	x		x									
Cyperaceae	<i>Cyperus gracilis</i>	Slender Flat-sedge	Yes	x		x		x		x	x	x	x		x	x		x	x	x					
Apiaceae	<i>Daucus glochidiatus</i>	Native Carrot	Yes						x	x	x				x										
Fabaceae (Faboideae)	<i>Desmodium brachypodum</i>		Yes	x	x	x	x												x				x	x	x
Phormiaceae	<i>Dianella longifolia</i>		Yes												x							x		x	
Phormiaceae	<i>Dianella revoluta</i>		Yes																				x		
Convolvulaceae	<i>Dichondra repens</i>	Kidney Weed	Yes	x	x	x	x	x		x	x	x	x	x				x	x	x					
Sapindaceae	<i>Dodonaea viscosa</i>	Sticky Hop-bush	Yes								x		x	x	x										
Chenopodiaceae	<i>Einadia nutans</i>		Yes					x										x							
Poaceae	<i>Enneapogon gracilis</i>		Yes		x	x	x	x				x													x
Poaceae	<i>Enneapogon sp.</i>		Yes																			x			
Poaceae	<i>Entolasia stricta</i>		Yes																						x
Poaceae	<i>Eragrostis curvula</i>	African Lovegrass	No			x														x					
Poaceae	<i>Eragrostis sp.</i>		Yes																				x		
Poaceae	<i>Eriochloa pseudoacrotricha</i>		Yes				x					x												x	
Myrtaceae	<i>Eucalyptus albens</i>	White Box	Yes	x	x			x		x			x		x										
Myrtaceae	<i>Eucalyptus blakelyi</i>	Blakelys Red Gum	Yes						x	x	x														
Myrtaceae	<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Yes				x		x		x	x	x	x											
Myrtaceae	<i>Eucalyptus dwyeri</i>	Dwyers Red Gum	Yes				x																x	x	x
Myrtaceae	<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark	Yes		x				x	x													x	x	x
Convolvulaceae	<i>Evolvulus alsinoides</i>		Yes	x		x									x				x		x	x			

Family Name	Scientific Name	Common Name	Native	Survey Sites																							
				1	1 Rep	2	2 Rep	3	3 Rep	4	4 Rep	5	5 Rep	6	6 Rep	7	7 Rep	8	8 Rep	9	9 Rep	10	10 Rep	11	11 Rep		
Santalaceae	<i>Exocarpos cupressiformis</i>		Yes													x											
Moraceae	<i>Ficus rubigosa</i>		Yes																				x				
Cyperaceae	<i>Fimbristylis dichotoma</i>		Yes																			x					
Rutaceae	<i>Geijera parviflora</i>	Wilga	Yes	x		x		x	x		x	x	x														
Fabaceae (Faboideae)	<i>Glycine clandestina</i>	Twining Glycine	Yes			x						x															
Fabaceae (Faboideae)	<i>Glycine</i> sp.		Yes							x			x	x													
Goodeniaceae	<i>Goodenia rotundifolia</i>		Yes	x	x							x	x		x	x											
Poaceae	<i>Hordeum leporinum</i>	Barley grass	No								x							x					x				
Fabaceae (Faboideae)	<i>Indigofera</i> sp.		Yes													x								x			
Brassicaceae	<i>Lepidium africanum</i>	Common Peppercross	No	x				x	x	x			x		x			x									
Solanaceae	<i>Lycium ferocissimum</i>	African Boxthorn	No					x	x							x											
Chenopodiaceae	<i>Maireana microphylla</i>	Small-leaf Bluebush	Yes	x	x			x							x	x		x									
Malvaceae	<i>Malva</i> sp.		Yes												x				x								
Fabaceae	<i>Medicago polymorpha</i>		No																	x							
Myrtaceae	<i>Melaleuca bracteata</i>		Yes					x	x	x	x																
Ericaceae	<i>Melichrus urceolatus</i>		Yes																					x			
Poaceae	<i>Microlaena stipoides</i>		Yes					x		x	x	x	x														
Myrtaceae	<i>Micromyrtus sessilis</i>		Yes																			x	x	x	x		
Asteraceae	<i>Minuria denticulata</i>		Yes																			x		x			
Oleaceae	<i>Notelaea microcarpa</i>	Native Olive	Yes					x	x	x					x	x						x	x	x			
Asteraceae	<i>Olearia elliptica</i>		Yes																					x			
Cactaceae	<i>Opuntia stricta</i>	Prickly Pear	No	x	x	x		x	x	x	x		x		x					x		x	x	x			
Oxalidaceae	<i>Oxalis perennans</i>		Yes	x				x		x	x		x	x				x	x	x	x	x	x	x			
Poaceae	<i>Panicum buncei</i>		Yes																	x	x						
Poaceae	<i>Panicum</i> sp.		Yes		x										x												
Apocynaceae	<i>Parsonsia eucalyptophylla</i>	Gargaloo	No							x																	
Poaceae	<i>Paspalidium distans</i>		Yes													x				x	x						
Caryophyllaceae	<i>Petrorhagia nanteuillii</i>		No	x	x	x			x		x	x			x			x		x							
Rutaceae	<i>Phebalium squamulosum</i>		Yes																				x				
Thymelaeaceae	<i>Pimelea linifolia</i>	Slender Rice-flower	Yes	x	x	x	x		x	x	x				x	x						x		x	x		
Plantaginaceae	<i>Plantago</i> sp.		Yes					x			x																
Acanthaceae	<i>Rostellularia adscendens</i>		Yes		x								x	x													

Family Name	Scientific Name	Common Name	Native	Survey Sites																					
				1	1 Rep	2	2 Rep	3	3 Rep	4	4 Rep	5	5 Rep	6	6 Rep	7	7 Rep	8	8 Rep	9	9 Rep	10	10 Rep	11	11 Rep
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock	Yes											x					x						
Chenopodiaceae	<i>Sclerolaena birchii</i>	Galvanized Burr	Yes											x	x			x							
Asteraceae	<i>Senecio quadridentatus</i>	Cotton Fireweed	Yes															x							
Malvaceae	<i>Sida sp.</i>		Yes	x	x							x	x	x		x	x		x						
Asteraceae	<i>Sigesbeckia orientalis</i>		Yes																			x		x	
Brassicaceae	<i>Sisymbrium orientale</i>		No	x												x									
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	No					x	x		x							x							
Solanaceae	<i>Solanum esuriale</i>		Yes									x													
Solanaceae	<i>Solanum cinereum</i>		Yes																					x	
Poaceae	<i>Sporobolus sp.</i>	Fairy Grass	Yes															x							
Fabaceae (Faboideae)	<i>Swainsona galegifolia</i>		Yes					x						x											
Zygophyllaceae	<i>Tribulus terrestris</i>		No															x							
Urticaceae	<i>Urtica dioica</i>		No						x	x															
Verbenaceae	<i>Verbena bonariensis</i>		No								x			x					x	x					
Asteraceae	<i>Vittadinia cuneata</i>	Fuzzweed	Yes	x		x					x	x	x					x	x						
Asteraceae	<i>Vittadinia hispidula</i>		Yes															x	x		x	x			
Asteraceae	<i>Vittadinia sp.</i>		Yes	x	x									x	x	x		x							
Campanulaceae	<i>Wahlenbergia sp.</i>	Bluebell	Yes	x	x		x		x	x				x	x			x				x		x	
Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>		Yes																				x		
Total Species Richness				28	25	19	18	25	27	27	28	25	23	31	23	13	13	23	18	13	14	18	25	23	17
Native Species Richness				24	20	16	18	20	16	21	21	21	18	24	19	8	5	18	15	8	11	17	23	22	17
Exotic Species Richness				4	5	3	0	5	11	6	7	4	5	7	4	5	8	5	3	5	3	1	2	1	0

[illegible]

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	NATIVE	12	12 REP	13	13 REP	14	14 REP	15	15 REP	16	16 REP	17	17 REP	18	18 REP	19	19 REP
Goodeniaceae	<i>Goodenia rotundifolia</i>		Yes					x							x	x	x		
Proteaceae	<i>Grevillea floribunda</i>		Yes																
Dilleniaceae	<i>Hibbertia obtusifolia</i>		Yes					x	x										
Poaceae	<i>Hordeum leporinum</i>	Barley grass	No												x				
Fabaceae (Faboideae)	<i>Indigofera australis</i>	Austral Indigo	Yes																x
Oleaceae	<i>Jasminum sp.</i>		Yes	x															
Juncaceae	<i>Juncus usitatus</i>	Billabong Rush	Yes	x															
Brassicaceae	<i>Lepidium africanum</i>	Common Peppercross	No		x														
Cyperaceae	<i>Lepidosperma laterale</i>	Variable Sword-sedge	Yes									x	x						
Myrtaceae	<i>Leptospermum polygalifolium</i>		Yes																x
Lomandraceae	<i>Lomandra longifolia</i>	Spiny-headed Mat-rush	Yes	x	x								x						x
Lomandraceae	<i>Lomandra multiflora</i>		Yes					x	x										
Zamiaceae	<i>Macrozamia secunda</i>		Yes									x							
Chenopodiaceae	<i>Maireana microphylla</i>	Small-leaf Bluebush	Yes		x	x	x				x								
Poaceae	<i>Microlaena stipoides</i>		Yes		x									x					
Myrtaceae	<i>Melaleuca uncinata</i>		Yes						x			x							
Epacridaceae	<i>Melichrus urceolatus</i>	Urn Heath	Yes					x	x				x		x		x		
Oleaceae	<i>Notolea microcarpa</i>		Yes						x										x
Asteraceae	<i>Olearia elliptica</i>		Yes									x	x						
Cactaceae	<i>Opuntia streptacantha</i>	Cardona Pear	No								x								
Cactaceae	<i>Opuntia stricta</i>	Prickly Pear	No		x	x	x												
Oxalidaceae	<i>Oxalis sp.</i>		Yes		x				x									x	x
Poaceae	<i>Panicum buncei</i>		Yes	x										x					
Poaceae	<i>Panicum sp.</i>		Yes	x					x		x								
Poaceae	<i>Paspalidium sp.</i>		Yes	x	x	x						x						x	x
Apocynaceae	<i>Parsonsia eucalyptophylla</i>	Gargaloo	Yes			x	x												
Proteaceae	<i>Persoonia sericea</i>		Yes						x				x						
Caryophyllaceae	<i>Petrorhagia nanteuilii</i>	Childling Pink	No							x									
Myrtaceae	<i>Phebalium squamulosum</i>		Yes					x	x			x	x		x	x	x		x
Rutaceae	<i>Philothea ciliata</i>		Yes					x	x			x	x	x	x	x	x		x
Plantaginaceae	<i>Plantago sp.</i>		Yes	x	x														
Rhamnaceae	<i>Pomaderris queenslandica</i>	Scant Pomaderris	Yes						x										
Rubiaceae	<i>Pomax umbellata</i>	Pomax	Yes					x				x	x			x	x		

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	NATIVE	12	12 REP	13	13 REP	14	14 REP	15	15 REP	16	16 REP	17	17 REP	18	18 REP	19	19 REP
Fabaceae (Faboideae)	<i>Prostanthera sp.</i>		No						x		x								
Amaranthaceae	<i>Ptilotus exaltatus</i>					x													
Polygonaceae	<i>Rumex brownii</i>	Swamp Dock	Yes							x									
Poaceae	<i>Rytidosperma sp.</i>		Yes			x													
Chenopodiaceae	<i>Sclerolaena birchii</i>	Galvanized Burr	Yes			x	x												
Asteraceae	<i>Senecio quadridentatus</i>	Cotton Fireweed	Yes	x															
Fabaceae (Caesalpinioideae)	<i>Senna artemisioides</i>		Yes						x									x	
Malvaceae	<i>Sida rhombifolia</i>		No		x														
Malvaceae	<i>Sida sp.</i>		Yes	x			x		x									x	
Solanaceae	<i>Solanum parvifolium</i>		Yes											x	x			x	
Solanaceae	<i>Solanum sp.</i>		Yes															x	x
Asteraceae	<i>Sonchus oleraceus</i>	Common Sowthistle	No	x	x					x									
Poaceae	<i>Sporobolus sp.</i>	Fairy Grass	Yes							x	x								
Poaceae	<i>Themeda triandra</i>	Kangaroo Grass	Yes	x								x							
Poaceae	<i>Tragus australianus</i>	Small Burrgrass	Yes	x											x				
Verbenaceae	<i>Glandularia aristigera</i>	Mayne's Pest	No		x					x	x								
Verbenaceae	<i>Verbena bonariensis</i>	Purpletop	No	x						x									
Asteraceae	<i>Vittadinia sp.</i>		Yes		x					x				x					
Asteraceae	<i>Vittadinia hispidula</i>		Yes	x	x														
Xanthorrhoeaceae	<i>Xanthorrhoea johnsonii</i>		Yes									x							
Total Species Richness				32	25	17	14	13	31	14	17	26	23	16	18	12	10	24	28
Native Species Richness				26	16	14	12	13	30	7	11	25	22	15	16	12	10	22	28
Exotic Species Richness				6	9	3	2	0	1	7	6	1	1	1	2	0	0	2	0

Appendix B – *Photo Monitoring Records*

APPENDIX B – PHOTO MONITORING RECORDS



Kenna BOA Site 1 2012



Kenna BOA Site 1 2015



Kenna BOA Site 1 Rep 2012



Kenna BOA Site 1 Rep 2015



Kenna BOA Site 2 2012



Kenna BOA Site 2 2015



Kenna BOA Site 2 Rep 2012



Kenna BOA Site 2 Rep 2015



Kenna BOA Site 3 2012



Kenna BOA Site 3 2015



Kenna BOA Site 3 Rep 2012



Kenna BOA Site 3 Rep 2015



Kenna BOA Site 4 2012



Kenna BOA Site 4 2015



Kenna BOA Site 4 Rep 2012



Kenna BOA Site 4 Rep 2015



Kenna BOA Site 5 2012



Kenna BOA Site 5 2015



Kenna BOA Site 5 Rep 2012



Kenna BOA Site 5 Rep 2015



Kenna BOA Site 6 2012



Kenna BOA Site 6 2015



Kenna BOA Site 6 Rep 2012



Kenna BOA Site 6 Rep 2015



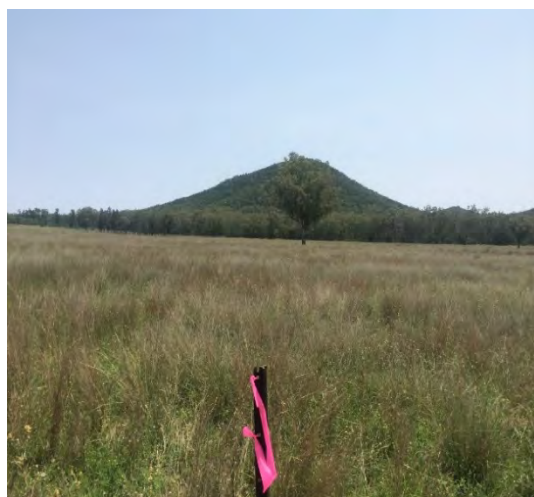
Kenna BOA Site 7 2012



Kenna BOA Site 7 2015



Kenna BOA Site 7 Rep 2012



Kenna BOA Site 7 Rep 2015



Kenna BOA Site 8 2012



Kenna BOA Site 8 2015



Kenna BOA Site 8 Rep 2012



Kenna BOA Site 8 Rep 2015



Kenna BOA Site 9 2012



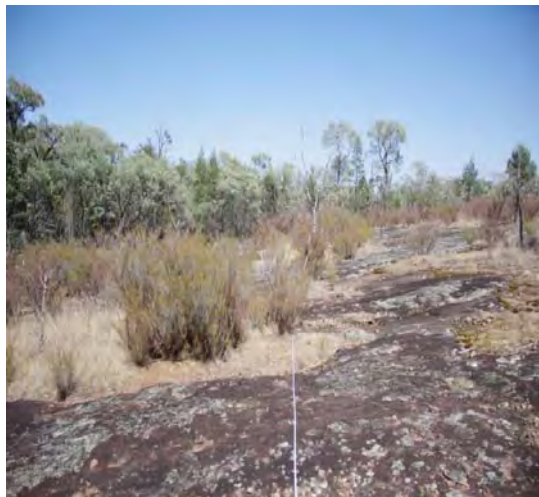
Kenna BOA Site 9 2015



Kenna BOA Site 9 Rep 2012



Kenna BOA Site 9 Rep 2015



Kenna BOA Site 10 2012



Kenna BOA Site 10 2015



Kenna BOA Site 10 Rep 2012



Kenna BOA Site 10 Rep 2015



Kenna BOA Site 11 2012



Kenna BOA Site 11 2015



Kenna BOA Site 11 Rep 2012



Kenna BOA Site 11 Rep 2015



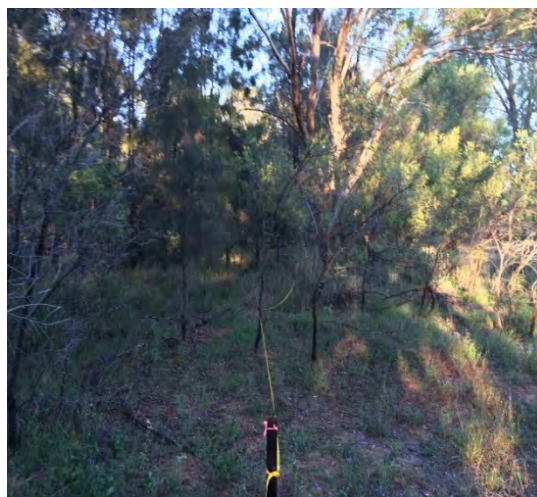
Mine BOA Site 12 2012



Mine BOA Site 12 2015



Mine BOA Site 12 Rep 2012



Mine BOA Site 12 Rep 2015



Mine BOA Site 13 2012



Mine BOA Site 13 2015



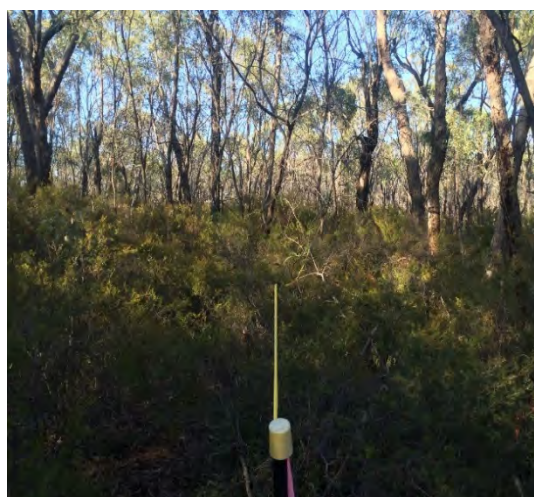
Mine BOA Site 13 Rep 2012



Mine BOA Site 13 Rep 2015



Mine BOA Site 14 2012



Mine BOA Site 14 2015



Mine BOA Site 14 Rep 2012



Mine BOA Site 14 Rep 2015



Mine BOA Site 15 2012



Mine BOA Site 15 2015



Mine BOA Site 15 Rep 2012



Mine BOA Site 15 Rep 2015



Mine BOA Site 16 2012



Mine BOA Site 16 2015



Mine BOA Site 16 Rep 2012



Mine BOA Site 16 Rep 2015



Mine BOA Site 17 2012



Mine BOA Site 17 2015



Mine BOA Site 17 Rep 2012



Mine BOA Site 17 Rep 2015



Mine BOA Site 18 2012



Mine BOA Site 18 2015



Mine BOA Site 18 Rep 2012



Mine BOA Site 18 Rep 2015



Mine BOA Site 19 2012



Mine BOA Site 19 2015



Mine BOA Site 19 Rep 2012



Mine BOA Site 19 Rep 2015

Appendix C – *Fauna Species List*

Table C1 Fauna Species List Kenna BOA

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT ¹	TSC ACT ²	S1	S1 REP	S2	S2 REP	S3	S3 REP	S4	S4 REP	S5	S5 REP	S6	S6 REP	S7	S7 REP	S8	S8 REP	S9	S9 REP	S10	S10 REP	S11	S11 REP	TB 1	TB 2	OPP3
Amphibians																													
Hylidae	<i>Litoria latopalmata</i>	Broad-palmed Frog			2	1																							
Hylidae	<i>Litoria peronii</i>	Peron's Tree Frog																											
Hylidae	<i>Litoria rubella</i>	Desert Tree Frog			1	1																							
Myobatrachidae	<i>Limnodynastes fletcheri</i>	Long-thumbed Frog																											
Myobatrachidae	<i>Limnodynastes tasmaniensis</i>	Spotted Grass Frog			4	1																							
Species richness					3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Abundance					7	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Birds																													
Accipitridae	<i>Aquila audax</i>	Wedge-tailed Eagle										1				2			1				1						
Aegothelidae	<i>Aegotheles cristatus</i>	Australian Owllet-nightjar																							1				
Alaudidae	<i>Mirafra javanica</i>	Singing Bushlark															2				1								
Alcedinidae	<i>Dacelo novaeguineae</i>	Laughing Kookaburra												1														0	
Alcedinidae	<i>Todiramphus sanctus</i>	Sacred Kingfisher																											
Anatidae	<i>Chenonetta jubata</i>	Australian Wood Duck																											
Ardeidae	<i>Egretta novaehollandiae</i>	White-faced Heron																											
Artamidae	<i>Artamus cyanopterus</i>	Dusky Woodswallow			1	1						1																0	
Artamidae	<i>Artamus leucorhynchus</i>	White-breasted Woodswallow									4																		
Artamidae	<i>Artamus personatus</i>	Masked Woodswallow											2	2		6			1		3							0	
Artamidae	<i>Artamus superciliosus</i>	White-browed Woodswallow			3	1					3	4	10	2	5	10	7	2	2	2	20	1	1				0	0	
Artamidae	<i>Cracticus nigrogularis</i>	Pied Butcherbird																									0		
Artamidae	<i>Cracticus tibicen</i>	Australian Magpie				2			1		1	1							5	5							0	0	
Artamidae	<i>Cracticus torquatus</i>	Grey Butcherbird			3				1	1	1			2											1		0	0	
Artamidae	<i>Strepera graculina</i>	Pied Currawong																											
Cacatuidae	<i>Cacatua roseicapilla</i>	Galah			3	2			1	2																	0	0	
Cacatuidae	<i>Cacatua sanguinea</i>	Little Corella												1															
Campephagidae	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike					2	1	1	1														1	1			0	
Campephagidae	<i>Lalage sueurii</i>	White-winged Triller			4	1			1	1	2	1		2	2	2			2	2	4						0	0	

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT ¹	TSC ACT ²	S1	S1 REP	S2	S2 REP	S3	S3 REP	S4	S4 REP	S5	S5 REP	S6	S6 REP	S7	S7 REP	S8	S8 REP	S9	S9 REP	S10	S10 REP	S11	S11 REP	TB 1	TB 2	OPP3
Meliphagidae	<i>Lichenostomus leucotis</i>	White-eared Honeyeater																					1	2	1	1			
Meliphagidae	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater					1				1	4		2	2	2				2								O	
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater									2	1																	
Meliphagidae	<i>Manorina melanocephala</i>	Noisy Miner			6	5				1		1		1													O	O	
Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater																											
Meliphagidae	<i>Philemon citreogularis</i>	Little Friarbird																	1									O	
Meliphagidae	<i>Philemon corniculatus</i>	Noisy Friarbird																	1	2			2				O	O	
Meliphagidae	<i>Plectorhyncha lanceolata</i>	Striped Honeyeater							1		1		1	1	1			1									O	O	
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	M																										
Motacillidae	<i>Anthus australis</i>	Australian (Richards) Pipit									1						1	1	1			1						O	
Muscicapidae	<i>Cinclorhampus mathewsi</i>	Rufous Songlark			2	3	2	1	1	2	4		3	2	4	1		1	1	2							O	O	
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella		V																									
Oriolidae	<i>Oriolus sagittatus</i>	Olive-backed Oriole																					1						
Pachycephalidae	<i>Colluricincla harmonica</i>	Grey Shrike-thrush				1		1			1	1												2		1		O	
Pachycephalidae	<i>Pachycephala pectoralis</i>	Golden Whistler																								2			
Pachycephalidae	<i>Pachycephala rufiventris</i>	Rufous Whistler				1	1	3	2	1	2	1	2						1						3	2	O	O	
Pardalotidae	<i>Acanthiza apicalis</i>	Inland Thornbill						2																		1			
Pardalotidae	<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill							3												3						O	O	
Pardalotidae	<i>Acanthiza nana</i>	Yellow Thornbill					2	1				6											2						
Pardalotidae	<i>Acanthiza reguloides</i>	Buff-rumped Thornbill																						3		3			
Pardalotidae	<i>Chthonicola sagittata</i> (syn. <i>Pyrholaemus sagittatus</i>)	Speckled Warbler		V			2	3				3	2	1									2	4	1			O	
Pardalotidae	<i>Gerygone fusca</i>	Western Gerygone										1																	
Pardalotidae	<i>Gerygone olivacea</i>	White-throated Gerygone			1		1	1	1																			O	
Pardalotidae	<i>Pardalotus punctatus</i>	Spotted Pardalote																										O	
Pardalotidae	<i>Pardalotus striatus</i>	Striated Pardalote								1		1												1	2	1		O	
Pardalotidae	<i>Sericornis frontalis</i>	White-browed Scrubwren																						1				O	
Pardalotidae	<i>Smicronis brevirostris</i>	Weebill												1									2	1	2	5	O		
Passeridae	<i>Taeniopygia bichenovii</i>	Double-barred Finch			2		2	4		2	3	15		2									2	2			O	O	

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT ¹	TSC ACT ²	S1	S1 REP	S2	S2 REP	S3	S3 REP	S4	S4 REP	S5	S5 REP	S6	S6 REP	S7	S7 REP	S8	S8 REP	S9	S9 REP	S10	S10 REP	S11	S11 REP	TB 1	TB 2	OPP3
Petroicidae	<i>Eopsaltria australis</i>	Eastern Yellow Robin					1				1			2								1	2	1	2	O	O		
Petroicidae	<i>Microeca fascinans</i>	Jacky Winter			1							1		1							1							O	
Petroicidae	<i>Petroica goodenovii</i>	Red-capped Robin																						1					
Podargidae	<i>Podargus strigoides</i>	Tawny Frogmouth							1		1		1																
Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe																											
Pomatostomidae	<i>Pomatostomus temporalis temporalis</i>	Grey-Crowned Babbler (Eastern subspecies)	V		1	3	5	5					2	2													O	O	
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot									1											1							
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck																											
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	V																									O	
Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot	V												1														
Psittacidae	<i>Northiella haematogaster</i>	Blue Bonnet																											
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella				2				2		1	2		4					2			1				O		
Psittacidae	<i>Psephotus haematonotus</i>	Red-rumped Parrot			6	13			4	5		1	2	2	2					3								O	
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook										1																	
Sturnidae	<i>Sturnus vulgaris</i>	Common Starling		U									1															O	
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis																									O		
Tytonidae	<i>Tyto javanica</i>	Pacific Barn Owl																											
Zosteropidae	<i>Zosterops lateralis</i>	Silvereye																				1	2	4	2				
Species richness					19	23	12	16	23	16	25	29	16	22	12	11	5	4	11	12	3	5	20	17	12	13			
Abundance					43	50	23	31	48	45	42	64	37	35	29	32	12	5	18	24	27	7	27	34	22	23			
Microchiropteran bats																													
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat		V	2		9		13	1	4	1			3		3		2	2			9		3	2			
Molossidae	<i>Austronomus australis</i>	White-striped Freetail-bat			4	1	9	4	4	1	6		18	1	7	6	4	1	13	5	2	17	10	12	4	18			
Molossidae	<i>Mormopterus petersi</i>	Inland Free-tailed Bat			17	22					4	33		2	4			1					1						
Molossidae	<i>Mormopterus planiceps</i>	South-eastern Free-tailed Bat			17	51	3	12	17	3	7	2	14	21	1	7	10	5	6	3	1		9	8		3			
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			424	473	22	5	107	101	51	33	18	13	32	51	9	3	21	13		1	7	10	3	6			
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat				3		2	8	9	21	11	1	1	12	22	3	2	1	1		2	5	2	1				
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle		V		5	11	14	10		63	21			3	2			2	3		2	4						

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT ¹	TSC ACT ²	S1	S1 REP	S2	S2 REP	S3	S3 REP	S4	S4 REP	S5	S5 REP	S6	S6 REP	S7	S7 REP	S8	S8 REP	S9	S9 REP	S10	S10 REP	S11	S11 REP	TB 1	TB 2	OPP3
Vespertilionidae	<i>Scotorepens greyii</i>	Little Broad-nosed Bat			13	27		6		5	6	5	6	8	12	32	3	3	4	12	3	4	6	10	3	3			
Vespertilionidae	<i>Vespadelus vulturnus</i>	Little Forest Bat			48	26	10	9	126	19	91	60	5	8	38	62	2	1	3	5	1	6	7	2	47	31			
Species richness					7	8	6	7	7	7	9	8	6	7	9	7	7	7	8	8	4	6	8	7	6	6			
Activity					525	608	64	52	285	139	253	166	62	54	112	182	34	16	52	44	7	32	57	45	61	63			
Mammals																													
Bovidae	<i>Ovis aries</i>	Sheep (feral)		U																									
Canidae	<i>Vulpes vulpes</i>	Fox		U					1	2																			
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit		U			1			4																			
Leporidae	<i>Oryctolagus/Lepus sp.</i>	Rabbit/Hare		U																									
Macropodidae	<i>Macropus dorsalis</i>	Black-striped Wallaby		E1																									
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo														2	2		13		4	2							
Macropodidae	<i>Macropus rufogriseus</i>	Red-necked Wallaby																											
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider		V																									
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum								1	1	4																	
Suidae	<i>Sus scrofa</i>	Pig (feral)		U																								✓	
Species richness							1		1	3	1	1				1	1		1		1	1							
Abundance							1		1	7	1	4				2	2		13		4	2							
Reptiles																													
Agamidae	<i>Amphibolurus nobbi</i>	Nobbi Dragon																								1			
Elapidae	<i>Furina diadema</i>	Red-naped Snake																							1				
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko			1																								
Gekkonidae	<i>Strophurus williamsi</i>	Eastern Spiny-tailed Gecko																											
Pygopodidae	<i>Delma plebeia</i>						1																						
Pygopodidae	<i>Delma tincta</i>																				2								
Scincidae	<i>Anomalopus leuckartii</i>					1																							
Scincidae	<i>Carlia foliorum</i>	Litter Skink					2		2	1			1		1														
Scincidae	<i>Ctenotus robustus</i>	Striped Skink					1														1	1							
Scincidae	<i>Menetia greyii</i>	Grey's Skink							1				1																
Scincidae	<i>Morethia boulengeri</i>	Boulenger's Skink																											
Varanidae	<i>Varanus gouldii</i>	Gould's Goanna																											
Varanidae	<i>Varanus varius</i>	Lace Monitor										1																	
Species richness					1	1	3	0	2	1	0	1	2	0	1	0	0	0	0	0	2	1	0	0	1	1			
Abundance					1	1	4	0	3	1	0	1	2	0	1	0	0	0	0	0	3	1	0	0	1	1			

Table C2 Fauna Species List Mine BOA

[illegible]

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT	TSC ACT	S12	S12 REP	S13	S13 REP	S14	S14 REP	S15	S15 REP	S16	S16 REP	S17	S17 REP	S18	S18 REP	S19	S19 REP	TB 3
Columbidae	<i>Ocyphaps lophotes</i>	Crested Pigeon			1	3	1	3											1	1	
Columbidae	<i>Phaps chalcoptera</i>	Common Bronzewing																			
Corcoracidae	<i>Corcorax melanorhamphos</i>	White-winged Chough					7	5					5								
Corcoracidae	<i>Struthidea cinerea</i>	Apostlebird				1	3	12							3						
Corvidae	<i>Corvus coronoides</i>	Australian Raven				3															
Cuculidae	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo																			
Cuculidae	<i>Chrysococcyx basalis</i>	Horsfield's Bronze-Cuckoo													1						
Cuculidae	<i>Chrysococcyx lucidus</i>	Shining Bronze-Cuckoo																	1		
Cuculidae	<i>Chrysococcyx osculans</i>	Black-eared Cuckoo																			
Cuculidae	<i>Cuculus pallidus</i>	Pallid Cuckoo							1												
Cuculidae	<i>Eudynamys scolopacea</i>	Common Koel																			
Cuculidae	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo																			
Dicaeidae	<i>Dicaeum hirundinaceum</i>	Mistletoebird							1	1			3	2	2	2	1			1	O
Dicruridae	<i>Grallina cyanoleuca</i>	Magpie-lark			1	2	1	2						1							
Dicruridae	<i>Myiagra inquieta</i>	Restless Flycatcher																			
Dicruridae	<i>Rhipidura fuliginosa</i>	Grey Fantail							1							1					O
Dicruridae	<i>Rhipidura leucophrys</i>	Willie Wagtail																	1		
Falconidae	<i>Falco cenchroides</i>	Nankeen Kestrel									1										
Falconidae	<i>Falco longipennis</i>	Australian Hobby			1																
Hirundinidae	<i>Hirundo neoxena</i>	Welcome Swallow																			
Hirundinidae	<i>Hirundo nigricans</i>	Tree Martin																			
Maluridae	<i>Malurus cyaneus</i>	Superb Fairy-wren											3	1							O
Maluridae	<i>Malurus lamberti</i>	Variegated Fairy-wren							4	4					1	1	3	5			
Meliphagidae	<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater							1				1						1		
Meliphagidae	<i>Caligavis chrysops</i>	Yellow-faced Honeyeater							2	1			1	1				1	1		O
Meliphagidae	<i>Entomyzon cyanotis</i>	Blue-faced Honeyeater				1															
Meliphagidae	<i>Lichenostomus leucotis</i>	White-eared Honeyeater							1				1							1	O
Meliphagidae	<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater																			
Meliphagidae	<i>Lichmera indistincta</i>	Brown Honeyeater								2											
Meliphagidae	<i>Manorina melanoccephala</i>	Noisy Miner			5	5	2	3					1								
Meliphagidae	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater							2						1						O

[illegible]

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT	TSC ACT	S12	S12 REP	S13	S13 REP	S14	S14 REP	S15	S15 REP	S16	S16 REP	S17	S17 REP	S18	S18 REP	S19	S19 REP	TB 3
Psittacidae	<i>Alisterus scapularis</i>	Australian King-Parrot														3					
Psittacidae	<i>Barnardius zonarius</i>	Australian Ringneck													2						
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet		V																	
Psittacidae	<i>Neophema pulchella</i>	Turquoise Parrot		V																	
Psittacidae	<i>Northiella haematogaster</i>	Blue Bonnet			2																
Psittacidae	<i>Platycercus eximius</i>	Eastern Rosella			4	2		2							1	2					
Psittacidae	<i>Psephotus haematotus</i>	Red-rumped Parrot						8													
Strigidae	<i>Ninox novaeseelandiae</i>	Southern Boobook					1														
Sturnidae	<i>Sturnus vulgaris</i>	Common Starling		U																	
Threskiornithidae	<i>Threskiornis spinicollis</i>	Straw-necked Ibis																			
Tytonidae	<i>Tyto javanica</i>	Pacific Barn Owl						1						1							
Zosteropidae	<i>Zosterops lateralis</i>	Silvereye							1						1	2					O
Species richness					10	14	10	15	21	9	2	0	16	16	17	11	10	6	15	7	18
Abundance					27	35	39	59	30	15	2	0	28	21	31	22	12	11	17	9	-
Mammals																					
Bovidae	<i>Ovis aries</i>	Sheep (feral)		U	1																
Canidae	<i>Vulpes vulpes</i>	Fox		U																	
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat		V																	
Leporidae	<i>Oryctolagus cuniculus</i>	Rabbit		U																	
Leporidae	<i>Oryctolagus/Lepus sp.</i>	Rabbit/Hare		U																	
Macropodidae	<i>Macropus dorsalis</i>	Black-striped Wallaby		E1																	
Macropodidae	<i>Macropus giganteus</i>	Eastern Grey Kangaroo					1														
Macropodidae	<i>Macropus rufogriseus</i>	Red-necked Wallaby									1										
Petauridae	<i>Petaurus norfolcensis</i>	Squirrel Glider		V				1													
Phalangeridae	<i>Trichosurus vulpecula</i>	Common Brushtail Possum																			
Suidae	<i>Sus scrofa</i>	Pig (feral)		U	4	4															
Species richness					2	1	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Abundance					5	4	1	1	0	0	1	0	0	0	0	0	0	0	0	0	0
Microchiropteran bats																					
Emballonuridae	<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail-bat		V	2		2			1	1			1		4	1		3		
Molossidae	<i>Auromus australis</i>	White-striped Freetail-bat			1	1		1	2	1				1		1			1		
Molossidae	<i>Mormopterus petersi</i>	Inland Free-tailed Bat					6														
Molossidae	<i>Mormopterus planiceps</i>	South-eastern Free-tailed Bat			2			7		1		5			2					1	

FAMILY NAME	SCIENTIFIC NAME	COMMON NAME	EPBC ACT	TSC ACT	S12	S12 REP	S13	S13 REP	S14	S14 REP	S15	S15 REP	S16	S16 REP	S17	S17 REP	S18	S18 REP	S19	S19 REP	TB 3
Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat			27	24	14	24	71	37	8	14	80	15	7	5	5	11	16	11	
Vespertilionidae	<i>Chalinolobus morio</i>	Chocolate Wattled Bat				7		1	1			2	17	18					11		
Vespertilionidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle		V	6	1	7	2	14		3	3	52	19	5				6	1	
Vespertilionidae	<i>Scotorepens greyii</i>	Little Broad-nosed Bat			1	6		12	74	29	1	16	20	14	1	3	2	4	33	12	
Vespertilionidae	<i>Vespadelus vulturnus</i>	Little Forest Bat			2	2	3	12		29	3	18	22	13	2	1			3		
Species richness					7	6	5	7	5	6	5	6	5	7	5	5	3	2	7	4	
Activity					41	41	32	59	162	98	16	58	191	81	17	14	8	15	73	25	
Reptiles																					
Agamidae	<i>Amphibolurus nobbi</i>	Nobbi Dragon												1							
Elapidae	<i>Furina diadema</i>	Red-naped Snake																			
Gekkonidae	<i>Heteronotia binoei</i>	Bynoe's Gecko																			✓
Gekkonidae	<i>Strophurus williamsi</i>	Eastern Spiny-tailed Gecko																	1		
Pygopodidae	<i>Delma plebeia</i>																				
Pygopodidae	<i>Delma tincta</i>																				
Scincidae	<i>Anomalopus leuckartii</i>																				
Scincidae	<i>Carlia foliorum</i>	Litter Skink														1			2		
Scincidae	<i>Ctenotus robustus</i>	Striped Skink																			
Scincidae	<i>Egernia striolata</i>	Tree Skink																			✓
Scincidae	<i>Menetia greyii</i>	Grey's Skink																		1	
Scincidae	<i>Morethia boulengeri</i>	Boulenger's Skink												1							
Varanidae	<i>Varanus gouldii</i>	Gould's Goanna																			✓
Varanidae	<i>Varanus varius</i>	Lace Monitor																			
Species richness					0	0	0	0	0	0	0	0	0	2	0	1	0	0	2	1	3
Abundance					0	0	0	0	0	0	0	0	0	2	0	1	0	0	3	1	

Appendix D – *Surface Water Data*

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
	KCUS	31 July 2007	7.9	255	22		<10	
	KCDS	31 July 2007	8	205	163		15	
	KC2US	31 July 2007	6.7	75	84		18	
	KC2DS	31 July 2007	6.7	85	21		12	
	KC1US	31 July 2007	8.2	1300	15		<10	
	KC1DS	31 July 2007	6.9	430	39		<10	
31489.01	KC2US	23 September 2008	6.5	65	35	<2	-	
31489.02	KC1US	23 September 2008	8.0	65	320	<2	-	
31489.03	KCUS	23 September 2008	7.7	315	168	<2	-	
31489.04	KCDS	23 September 2008	7.2	230	150	<2	-	
31489.05	PC	23 September 2008	7.2	90	294	<2	-	
31489.06	PC1	23 September 2008	7.0	90	62	<2	-	
31489.07	KC1DS	23 September 2008	7.1	220	1280	<2	-	
31489.08	KC2DS	23 September 2008	7.2	165	444	<2	-	
32276.01	KCDS	15 December 2008	7.1	355	21	<2	-	
32276.02	KC2US	15 December 2008	6.9	95	8	<2	-	
32276.03	KCUS	15 December 2008	7.5	55	6	<2	-	
32276.04	PC	15 December 2008	7.2	125	12	<2	-	
32276.05	PC1	15 December 2008	6.9	255	23	<2	-	
32276.06	KC1DS	15 December 2008	8.2	315	42	<2	-	
32276.07	KC2DS	15 December 2008	7.4	185	289	<2	-	
32373.01	KC1US	29 December 2008	6.9	95	48	<2	-	
32373.02	KC2US	29 December 2008	6.8	90	17	<2	-	
32373.03	KCDS	29 December 2008	7.1	450	26	<2	-	
32815.01	KCUS	17 February 2009	7.2	280	123	<2	-	
32815.02	KC2US	17 February 2009	6.7	70	14	<2	-	
32815.03	KCDS	17 February 2009	6.9	180	132	<2	-	
32815.04	PC	17 February 2009	7.1	60	57	<2	-	
32815.05	PC1	17 February 2009	7.1	180	38	<2	-	
32815.06	KC1DS	17 February 2009	7.1	145	142	<2	-	
32815.07	KC2DS	17 February 2009	7.1	105	1130	<2	-	
ES0919730-001	KC2DS	29 December 2009	7.15	95	48	-	13	Oil & Grease not reported for any location due to incorrect sample bottle and insufficient sample. No site discharge - only adjacent creek samples
ES0919730-002	KCDS	29 December 2009	6.94	187	33	-	11	
ES0919730-003	KC2US	29 December 2009	6.67	86	4	-	16	
ES0919730-004	KC1US	29 December 2009	6.7	74	47	-	6	
ES0919730-005	KCUS	29 December 2009	7.05	305	52	-	9	
ES0919730-007	PC	29 December 2009	7.23	83	117	-	8	
ES0919730-008	KC1DS	29 December 2009	7.12	171	79	-	10	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1000146-001	KCUS	5 January 2010	7.24	804	2	<5	10	
ES1000146-002	KC1US	5 January 2010	7.42	126	8	<5	12	
ES1000146-003	KCDS	5 January 2010	7.41	456	2	<5	14	
ES1000146-004	SD5	5 January 2010	7.23	155	18	<5	8	Discharge
ES1000146-005	PC1	5 January 2010	7.3	174	7	<5	12	
ES1000146-006	PC	5 January 2010	7.38	121	8	<5	15	
ES1000146-007	KC1DS	5 January 2010	7.28	419	6	<5	10	
ES1000146-008	KC2DS	5 January 2010	7.47	178	22	<5	12	
ES1013938-001	PC1	14 July 2010	8.5	37	126	<5	13	
ES1013938-002	PC	14 July 2010	8.65	226	10	<5	9	
ES1013938-003	KC1DS	14 July 2010	8.01	552	27	-	13	
ES1013938-004	KC2DS	14 July 2010	7.92	211	142	<5	16	
ES1015034-001	KCUS	28 July 2010	8.18	72	130	<5	12	
ES1015034-002	PC	28 July 2010	7.95	170	151	<5	11	
ES1015034-003	PCI	28 July 2010	7.978	37	132	<5	9	
ES1015034-004	KC1DS	28 July 2010	7.77	36	90	<5	9	
ES1016053-001	KCUS	10 August 2010	7.45	33	296	<5	5	
ES1016053-002	KC1US	10 August 2010	7.65	169	2760	<5	10	
ES1016053-003	KC2US	10 August 2010	7.7	37	62	<5	12	
ES1016053-004	PC1	10 August 2010	7.54	43	1320	<5	6	
ES1016053-005	PC	10 August 2010	6.83	62	167	<5	7	
ES1016053-006	KC1DS	10 August 2010	6.8	64	380	<5	9	
ES1016053-007	KC2DS	10 August 2010	6.76	114	40	<5	17	
ES1016053-008	KCDS	10 August 2010	7.08	30	326	<5	4	
ES1016966-101	KCUS	23 August 2010	8.04	100	236	<5	9	
ES1016966-102	KC1US	23 August 2010	7.84	210	1600	<5	5	
ES1016966-103	KC2US	23 August 2010	8.05	58	48	<5	15	
ES1016966-104	KCDS	23 August 2010	7.97	50	122	<5	5	
ES1016966-105	SD5	23 August 2010	7.9	60	22	<5	11	No discharge. Sampled to determine sediment level.
ES1016966-106	PC1	23 August 2010	7.94	49	476	<5	7	
ES1016966-107	KC1DS	23 August 2010	7.37	193	146	<5	8	
ES1016966-108	KC2DS	23 August 2010	7.63	94	35	<5	15	
ES1016966-109	PC	23 August 2010	7.71	70	142	<5	10	
ES1018432-001	KCUS	10 September 2010	7.44	909	246	<5	8	
ES1018432-002	KC1US	10 September 2010	7.2	154	193	<5	10	
ES1018432-003	KC2US	10 September 2010	6.84	147	81	<5	11	
ES1018432-004	KCDS	10 September 2010	7.26	492	116	<5	10	
ES1018432-005	PC1	10 September 2010	7.18	65	176	<5	10	
ES1018432-006	PC	10 September 2010	7.21	159	26	<5	17	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1018432-007	KC1DS	10 September 2010	7.66	955	131	<5	12	
ES1018432-008	KC2DS	10 September 2010	7.25	133	84	<5	16	
ES1023281-001	KCUS	16 November 2010	7.83	866	162	10	12	
ES1023281-002	PC1	16 November 2010	7.27	98	260	9	9	
ES1023281-003	PC	16 November 2010	6.94	179	127	39	20	Elevated Oil and Grease
ES1024687-001	KC2US	30 November 2010	6.99	86	40	<5	14	
ES1024687-002	KCUS	30 November 2010	7.12	93	20	<5	15	
ES1024687-003	KC1US	30 November 2010	6.97	64	124	<5	10	
ES1024687-004	PC	30 November 2010	6.9	46	40	<10	14	
ES1024687-005	PC1	30 November 2010	7.42	101	136	<10	10	
ES1024687-006	KCDS	30 November 2010	7.11	191	191	<5	14	
ES1024687-007	KC1DS	30 November 2010	7.23	150	150	<5	15	
ES1024687-008	KC2DS	30 November 2010	7.2	101	101	<5	12	
ES1119821-001	PC1	9 September 2011	6.84	29	38	<5	10	
ES1119821-002	PC	9 September 2011	7.31	134	71	<5	13	
ES1119821-003	KC1DS	9 September 2011	7.58	209	66	<5	22	
ES1119821-004	KC2DS	9 September 2011	7.58	124	101	<5	15	
ES1121355-001	KC2US	29 September 2011	6.69	76	38	<5	14	
ES1121355-002	KCUS	29 September 2011	6.88	73	160	<5	10	
ES1121355-003	PC1	29 September 2011	7.08	87	255	<5	9	
ES1121355-004	PC	29 September 2011	6.89	63	198	<5	9	
ES1121355-005	KC1DS	29 September 2011	7.17	92	167	<5	9	
ES1121355-006	KCDS	29 September 2011	6.93	434	530	<5	38	
ES1121355-007	KC2DS	29 September 2011	7.41	134	36	<5	12	
ES1124936-001	KC2US	14 November 2011	7.24	94	30	<5	26	
ES1124936-002	PC1	14 November 2011	7.36	158	220	<5	14	
ES1124936-003	PC	14 November 2011	7.93	167	73	<5	8	
ES1124936-004	KC1DS	14 November 2011	7.6	157	104	<5	13	
ES1126001-001	KC2US	23 November 2011	6.74	32	66	<5	12	
ES1126001-002	KCUS	23 November 2011	6.89	38	788	<5	13	
ES1126001-003	KC1US	23 November 2011	7.47	112	144	<5	12	
ES1126001-004	PC1	23 November 2011	7.22	60	202	<5	9	
ES1126001-005	PC	23 November 2011	6.75	72	322	<5	14	
ES1126001-006	KC1DS	23 November 2011	7.09	75	372	<5	16	
ES1126001-007	KC2DS	23 November 2011	7.09	90	59	<5	20	
ES1126001-008	KCDS	23 November 2011	6.87	88	536	<5	16	
ES1126200-001	SD2	25 November 2011	7.24	83	42	<5	7	
ES1126200-002	SD5	25 November 2011	7.48	125	83	<5	6	

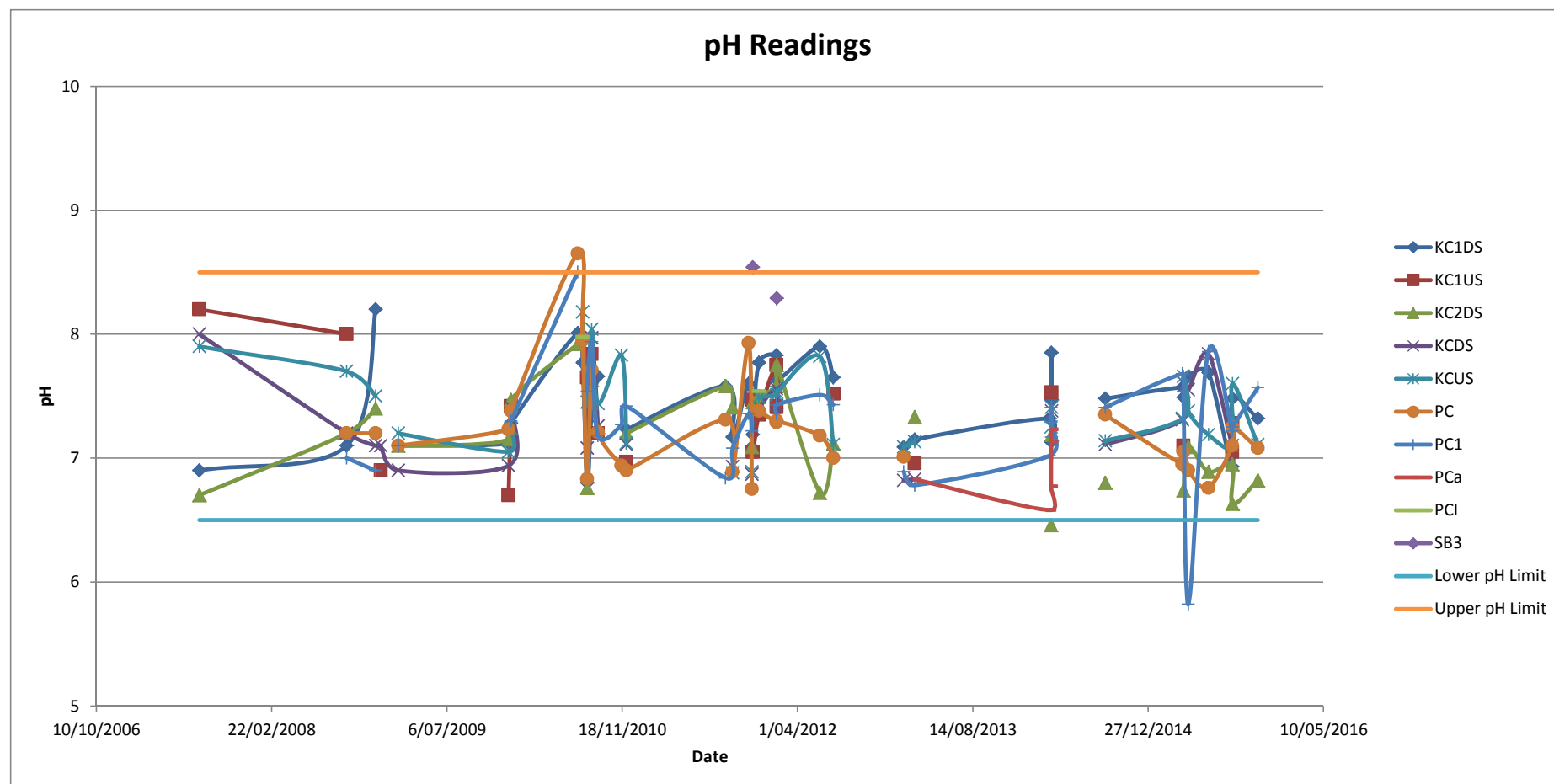
Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1126200-003	SB3	25 November 2011	8.54	663	478	<5	4	Sampled overflowing dam
ES1126200-004	KC2DS	25 November 2011	7.45	99	49	<5	6	
ES1126200-005	KC2US	25 November 2011	7.04	37	18	<5	6	
ES1126200-006	KC1US	25 November 2011	7.05	62	191	<5	7	
ES1126200-007	SD4	25 November 2011	7.52	131	166	<5	7	
ES1126200-008	KC1DS	25 November 2011	7.19	86	384	<5	4	
ES1127632-001	SD4	13 December 2011	7.69	200	48	<5	5	
ES1127632-002	SD2	13 December 2011	7.2	106	82	<5	8	
ES1127632-003	SD5	13 December 2011	7.62	148	24	<5	6	
ES1127632-004	KC2DS	13 December 2011	7.5	134	16	<5	7	
ES1127632-005	KCDS	13 December 2011	7.41	200	64	<5	10	
ES1127632-006	KC2US	13 December 2011	7.13	58	9	<5	8	
ES1127632-007	KCUS	13 December 2011	7.49	277	120	<5	11	
ES1127632-008	KC1US	13 December 2011	7.35	180	26	<5	11	
ES1127632-009	PCI	13 December 2011	7.54	113	60	<5	8	
ES1127632-010	PC	13 December 2011	7.38	168	12	<5	11	
ES1127632-011	KC1DS	13 December 2011	7.77	741	43	<5	10	
ES1202508-001	KC2DS	1 February 2012	7.58	143	52	<5	11	
ES1202508-002	KCDS	1 February 2012	7.56	544	30	<5	7	
ES1202508-003	KC2US	1 February 2012	7.11	58	41	<5	9	
ES1202508-004	KCUS	1 February 2012	7.51	750	397	<5	6	
ES1202508-005	KC1US	1 February 2012	7.75	172	83	<5	8	
ES1202508-006	PC1	1 February 2012	7.36	63	73	<5	5	
ES1202508-007	PC	1 February 2012	7.29	59	81	<5	5	
ES1202508-008	KC1DS	1 February 2012	7.83	216	58	<5	8	
ES1202508-009	SD2	1 February 2012	7.91	178	20	<5	6	
ES1202508-010	SD4	1 February 2012	7.9	212	247	<5	5	
ES1202508-011	SD5	1 February 2012	7.84	148	36	<5	7	
ES1202509-001	SB3	2 February 2012	8.29	415	215	<5	2	Sampled overflowing dam
ES1202509-002	PC1	2 February 2012	7.43	48	80	<10	3	
ES1202509-003	KC1US	2 February 2012	7.42	70	36	<10	7	
ES1202509-004	KCUS	2 February 2012	7.53	113	300	<10	6	
ES1202509-005	KC2US	2 February 2012	7.28	42	16	<5	4	
ES1202509-006	KCDS	2 February 2012	7.35	54	15	<5	7	
ES1202509-007	KC2DS	2 February 2012	7.75	126	26	<10	5	
ES1202509-008	KC1DS	2 February 2012	7.63	114	84	<10	5	
ES1202509-009	PC	2 February 2012	7.3	67	70	<10	5	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1214027-001	KC2US	4 June 2012	7.27	82	20	<5	23	
ES1214027-002	KCUS	4 June 2012	7.82	218	52	<5	13	
ES1214027-003	PC1	4 June 2012	7.51	97	96	<5	16	
ES1214027-004	PC	4 June 2012	7.18	95	48	<5	13	
ES1214027-005	KC1DS	4 June 2012	7.9	1270	8	<5	10	
ES1214027-006	KC2DS	4 June 2012	6.72	136	108	<5	17	
ES1217576-001	KC2US	12 July 2012	6.86	50	32	<5	15	
ES1217576-002	KCUS	12 July 2012	7.11	62	229	<5	13	
ES1217576-003	PC1	12 July 2012	7.43	71	53	<5	10	
ES1217576-004	PC	12 July 2012	7	47	142	<5	8	
ES1217576-005	KC1DS	12 July 2012	7.65	230	88	<5	14	
ES1217576-006	KC2DS	12 July 2012	7.12	85	108	<5	20	
ES1217576-007	SD5	12 July 2012	7.33	98	122	<5	16	
ES1217572-001	SD2	13 July 2012	7.83	205	20	<5	14	
ES1217572-002	KC1US	13 July 2012	7.52	221	133	<5	21	
ES1302189-001	KCDS	29 January 2013	6.82	387	65	<5	16	
ES1302189-002	KC2US	29 January 2013	6.68	89	7	<5	31	
ES1302189-003	KCUS	29 January 2013	7.09	426	72	<5	15	
ES1302189-004	PC1	29 January 2013	6.89	92	90	<5	18	
ES1302189-005	PC	29 January 2013	7.01	162	55	<5	17	
ES1302189-006	KC1DS	29 January 2013	7.09	162	23	<5	20	
ES1305016-001	KCUS	1 March 2013	7.13	195	750	<5	6	
ES1305016-002	KCDS	1 March 2013	6.83	89	322	<5	16	Disturbance along rail line, just flowing @ rail line
ES1305016-003	KC1US	1 March 2013	6.96	88	238	<5	11	
ES1305016-004	KC1DS	1 March 2013	7.15	206	322	<5	10	
ES1305016-005	KC2US	1 March 2013	6.76	45	36	<5	9	
ES1305016-006	KC2DS	1 March 2013	7.33	204	27	<5	17	
ES1305016-007	PCa	1 March 2013	6.83	55	358	<5	10	
ES1305016-008	PC1	1 March 2013	6.78	54	234	<5	8	
ES1406431-001	PCA	21 March 2014	6.58	16	82	<5	5	
ES1406431-002	PC1	21 March 2014	7.02	87	12	<5	14	
ES1406431-003	KC1DS	21 March 2014	7.32	286	53	<5	31	
ES1406546-001	KCUS	25 March 2014	7.25	90	503	<5	6	
ES1406546-002	KC1DS	25 March 2014	7.13	99	68	<5	10	
ES1406546-003	KC2US	25 March 2014	6.65	70	35	<5	12	
ES1406546-004	KC2DS	25 March 2014	6.46	72	22	<5	14	
ES1406546-005	PCa	25 March 2014	6.77	58	302	<5	8	
ES1406546-006	PC1	25 March 2014	7.29	99	122	<5	6	

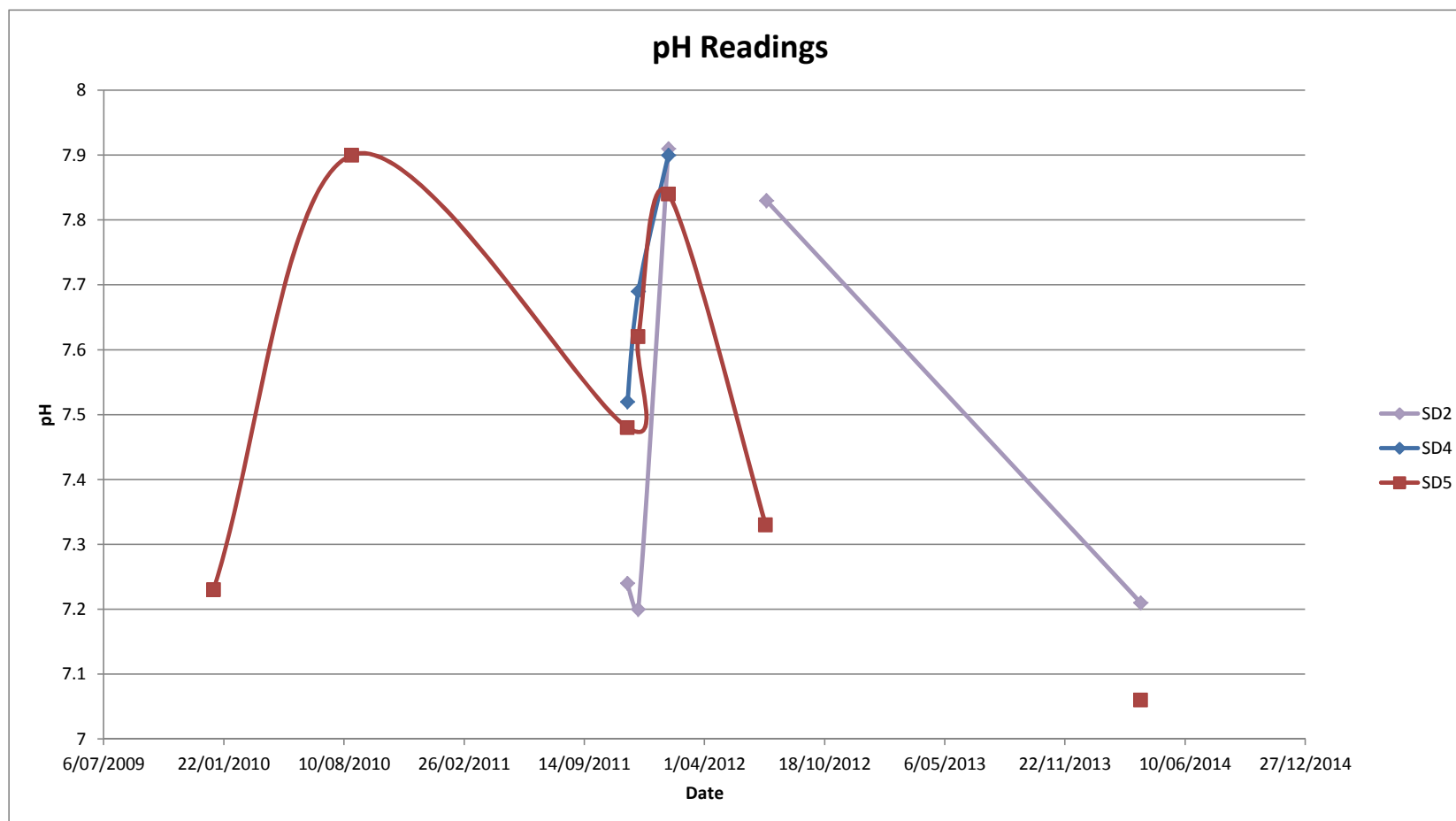
Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1406686-001	PC1	26 March 2014	7.41	122	<5	<5	15	
ES1406686-002	PCA	26 March 2014	7.13	72	39	<5	14	
ES1406686-003	KC1DS	26 March 2014	7.85	254	<5	<5	20	
ES1406891-001	PCA	27 March 2014	7.23	82	43	<5	13	
ES1406891-002	PC1	27 March 2014	7.17	78	129	<5	7	
ES1406891-003	KCUS	27 March 2014	7.41	195	92	<5	8	
ES1406891-004	KCDS	27 March 2014	7.38	130	58	<5	8	
ES1406891-005	KC1US	27 March 2014	7.53	113	14	<5	16	
ES1406891-006	KC1DS	27 March 2014	7.47	98	100	<5	12	
ES1406891-007	KC2US	27 March 2014	7.27	65	8	<5	10	
ES1406891-008	KC2DS	27 March 2014	7.19	79	88	<5	13	
ES1407152-001	SD2	28 March 2014	7.21	103	26	<5	12	
ES1407152-002	SD5	28 March 2014	7.06	72	18	<5	10	
ES1419357-001	KC2DS	27 August 2014	6.8	50	28	<5	21	
ES1419357-002	KCDS	27 August 2014	7.11	203	113	<5	11	
ES1419357-003	KC2US	27 August 2014	6.91	52	42	<5	16	
ES1419357-004	KCUS	27 August 2014	7.14	353	98	<5	11	
ES1419357-005	PC1	27 August 2014	7.41	77	16	<5	12	
ES1419357-006	PC	27 August 2014	7.35	98	238	<5	12	
ES1419357-007	KC1DS	27 August 2014	7.48	116	56	<5	15	
ES1507956-001	KCUS	4 April 2015	7.32	123	298	<5	6	
ES1507956-002	KCDS	4 April 2015	7.31	115	312	<5	7	
ES1507956-003	KC1DS	4 April 2015	7.57	155	45	<5	11	
ES1507956-004	KC2US	4 April 2015	7.32	58	27	<5	8	
ES1507956-005	PC	4 April 2015	6.95	53	356	<5	6	
ES1507956-006	PC1	4 April 2015	7.68	120	37	<5	8	
ES1507950-001	KC2DS	7 April 2015	6.74	84	32	<5	24	
ES1507950-002	KCDS	7 April 2015	7.61	194	67	<5	8	
ES1507950-003	KC2US	7 April 2015	7.42	78	16	<5	8	
ES1507950-004	KCUS	7 April 2015	7.66	262	66	<5	7	
ES1507950-005	KC1US	7 April 2015	7.1	96	100	<5	8	
ES1507950-006	PC1	7 April 2015	7.54	127	28	<5	8	
ES1507950-007	PC	7 April 2015	7.05	63	301	<5	7	
ES1507950-008	KC1DS	7 April 2015	7.49	143	45	<5	11	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1520301-001	KC2DS	21 April 2015	7.09	142	12	<5	8	
ES1520301-002	KCDS	21 April 2015	7.55	291	20	<5	8	
ES1520301-003	KC2US	21 April 2015	6.86	34	26	<5	8	
ES1520301-004	KCUS	21 April 2015	7.38	430	769	<5	5	
ES1520301-005	PC1	21 April 2015	5.82	32	32	<5	5	
ES1520301-006	PC	21 April 2015	6.9	29	184	<5	3	
ES1520301-007	KC1DS	21 April 2015	7.66	160	26	<5	13	
ES1524347-001	KCUS	17 June 2015	7.19	72	337	<5	11	
ES1524347-002	KCDS	17 June 2015	7.84	432	32	5	7	
ES1524347-003	KC1DS	17 June 2015	7.69	194	20	<5	18	
ES1524347-004	KC2US	17 June 2015	7.12	48	8	<5	11	
ES1524347-005	KC2DS	17 June 2015	6.89	68	22	<5	17	
ES1524347-006	PC	17 June 2015	6.76	34	284	<5	5	
ES1524347-007	PC1	17 June 2015	7.86	122	68	7	7	
ES1529285-001	KC2DS	24 August 2015	6.95	66	13	5	16	
ES1529285-002	KCDS	24 August 2015	7.1	140	194	5	15	
ES1529285-003	KC2US	24 August 2015	7.01	73	24	8	12	
ES1529285-004	KCUS	24 August 2015	7.1	177	192	<5	15	
ES1529285-005	KC1US	24 August 2015	7.05	136	188	<5	11	
ES1529285-006	PC1	24 August 2015	7.22	101	30	<5	15	
ES1529285-007	PC	24 August 2015	7.1	131	70	11	16	
ES1529285-008	KC1DS	24 August 2015	6.93	140	63	21	14	
ES1529288-003	KC2DS	25 August 2015	6.63	77	29	10	20	
ES1529288-004	KCDS	25 August 2015	7.26	308	18	9	12	
ES1529288-005	KC2US	25 August 2015	7.21	100	14	11	18	
ES1529288-006	KCUS	25 August 2015	7.6	612	23	11	10	
ES1529288-007	KC1US	25 August 2015	7.28	149	33	11	9	
ES1529288-008	PC1	25 August 2015	7.25	185	15	14	10	
ES1529288-009	PC	25 August 2015	7.25	153	32	<5	13	
ES1529288-010	KC1DS	25 August 2015	7.48	233	29	13	11	
ES1535804-001	KCUS	5 November 2015	7.11	702	665	<5	10	
ES1535804-002	KC1DS	5 November 2015	7.32	121	80	6	14	
ES1535804-003	KC2US	5 November 2015	6.77	47	16	6	12	
ES1535804-004	KC2DS	5 November 2015	6.82	64	48	-	21	O&G bottle broken in transit
ES1535804-005	PC	5 November 2015	7.08	91	90	11	16	
ES1535804-006	PC1	5 November 2015	7.57	168	191	<5	13	

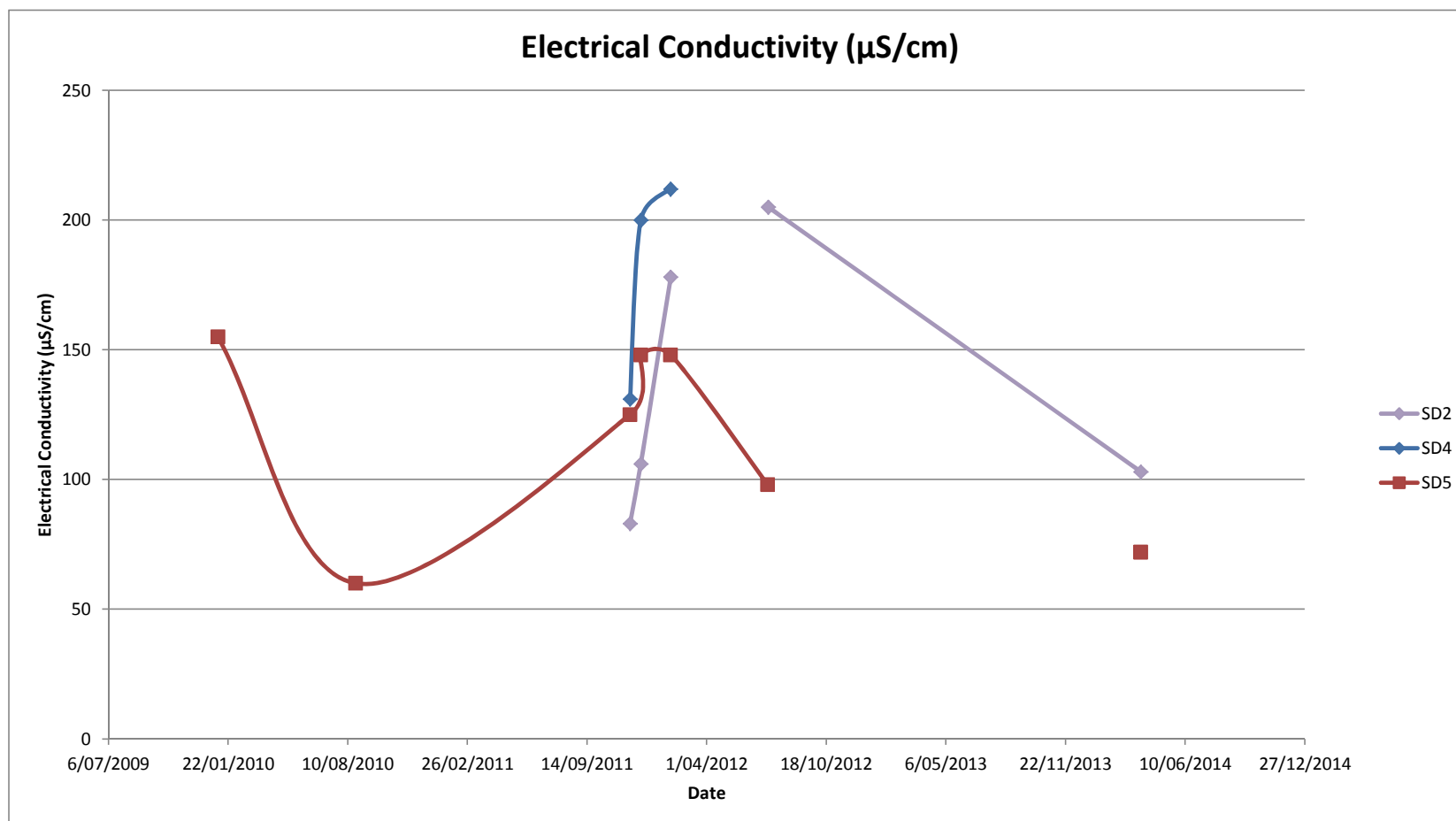
Sample No.	Sample Location	Date	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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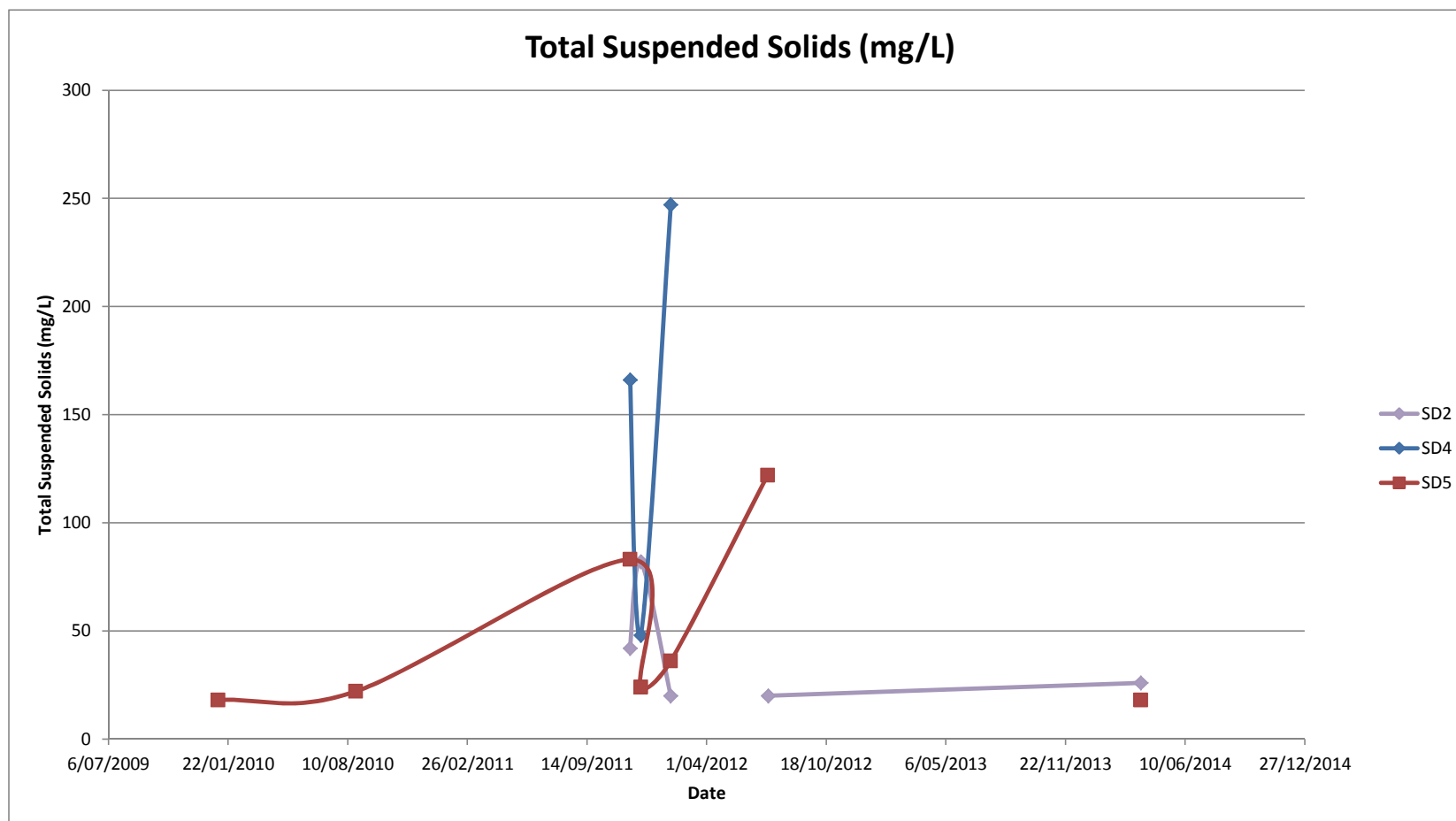
Sample No.	Sample Location	Date	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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Sample No.	Sample Location	Date	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES0908566-001	11 June 2009	SD1	8.38	378	74	<5	8	
ES0908566-002	11 June 2009	SD2	8.15	254	89	<5	5	
ES0908566-003	11 June 2009	SD3	7.85	308	328	<5	11	
ES0908566-004	11 June 2009	SD4	8.27	421	262	<5	7	
ES0908566-005	11 June 2009	SD5	8.07	228	26	<5	16	
ES0908566-006	11 June 2009	SB1	8.23	1390	11	<5	3	
ES0912774-001	26 August 2009	SD1	9.54	363	8	<5	8	
ES0912774-002	26 August 2009	SD2	8.33	274	28	<5	4	
ES0912774-003	26 August 2009	SD3	7.97	326	141	<5	12	
ES0912774-004	26 August 2009	SD4	8.37	498	66	<5	6	
ES0912774-005	26 August 2009	SD5	8.25	256	24	<5	5	
ES0912774-006	26 August 2009	SB1	8.37	2020	21	<5	<1	
ES0918374-001	1 December 2009	SD1	8.66	722	68	<10	14	
ES0918374-002	1 December 2009	SD2	8.41	374	1870	<10	5	
ES0918374-003	1 December 2009	SD3	8.37	550	216	<10	7	
ES0918374-004	1 December 2009	SD4	9.3	1150	204	<10	10	
ES0918374-005	1 December 2009	SD5	8.68	417	52	<10	5	
ES0918374-006	1 December 2009	SB1	8.82	5250	26	<10	<1	
ES1004140-001	3 March 2010	SD1	8.29	326	44	<5	5	
ES1004140-002	3 March 2010	SD2	8.74	271	126	<5	6	
ES1004140-003	3 March 2010	SD3	8.14	286	326	<5	15	
ES1004140-004	3 March 2010	SD5	8.2	218	44	<5	6	
ES1004140-005	3 March 2010	SB1	8.2	947	480	<5	<2	
ES1009341-001	14 May 2010	SD1	8.78	381	16	<5	6	
ES1009341-002	12 May 2010	SD4	8.85	543	80	7	6	
ES1009341-003	12 May 2010	SD3	8.14	472	92	<5	10	
ES1009341-004	12 May 2010	SD5	8.62	261	36	8	8	
ES1009341-005	12 May 2010	SB1	9	607	100	<5	7	
ES1016572-001	17 August 2010	SD2	7.62	129	72	<5	8	
ES1016572-002	17 August 2010	SD3	7.84	247	299	<5	6	
ES1016572-003	17 August 2010	SD4	7.89	306	120	<5	6	
ES1016572-004	17 August 2010	A1	9.09	1390	36	<5	8	
ES1016572-005	17 August 2010	A2	8.73	541	82	<5	7	
ES1016572-006	17 August 2010	SB1	8.52	432	82	<5	3	
ES1025816-001	13 December 2010	SD2	7.5	157	107	<5	10	
ES1025816-002	13 December 2010	SD5	7.46	139	46	<5	10	
ES1025816-003	13 December 2010	SD4	7.88	290	146	<5	6	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1025816-004	13 December 2010	A1	9.25	1280	25	<5	9	
ES1025816-005	13 December 2010	A2	9.13	840	10	<5	7	
ES1025816-006	13 December 2010	SB1	9.02	583	75	<5	5	
ES1026094-001	16 December 2010	BOX CUT SUMP	8.37	1360	76	-	4	O&G not analysed, Total TPH analysed instead
ES1026094-002	16 December 2010	A1	9.18	1480	56	-	7	O&G not analysed, Total TPH analysed instead
ES1026094-003	16 December 2010	D	8.05	331	228	-	9	O&G not analysed, Total TPH analysed instead
ES1102986-001	10 February 2011	A1	9.16	1260	14	<5	12	
ES1102986-002	10 February 2011	A2	9.17	874	<5	<5	10	
ES1102986-003	10 February 2011	A3	9.19	11300	16	<5	35	
ES1102986-004	10 February 2011	SB1	9.73	2150	52	<5	56	
ES1102986-005	10 February 2011	SD5	8.6	199	54	<5	16	
ES1106761-001	30 March 2011	BOX CUT SUMP	8.41	2100	98	-	31	O&G not analysed, Total TPH analysed instead
ES1106761-002	30 March 2011	A1	9.18	1540	14	-	8	O&G not analysed, Total TPH analysed instead
ES1106761-003	30 March 2011	SB1	9.5	3240	26	-	51	O&G not analysed, Total TPH analysed instead
ES1106761-004	30 March 2011	DAM G OR D	8.98	281	20	-	8	O&G not analysed, Total TPH analysed instead
ES1108782-001	27 April 2011	BOX CUT SUMP	8.4	2250	108	-	6	O&G not analysed, Total TPH analysed instead
ES1108782-002	27 April 2011	A1	9.34	14200	50	-	<1	O&G not analysed, Total TPH analysed instead
ES1108782-003	27 April 2011	SB1	9.57	4300	74	-	31	O&G not analysed, Total TPH analysed instead
ES1108782-004	27 April 2011	DAM G or D	8.63	251	48	-	6	O&G not analysed, Total TPH analysed instead
ES1109299-001	4 May 2011	SD1	8.15	452	44	<5	14	
ES1109299-002	4 May 2011	SD2	7.86	247	13	<5	6	
ES1109299-003	4 May 2011	SD3	8.02	416	20	<5	5	
ES1109299-004	4 May 2011	SD5	7.78	301	20	<5	9	
ES1109299-005	4 May 2011	SB1	9.2	4320	88	<5	49	
ES1109832-001	11 May 2011	BOX CUT SUMP	7.61	2390	148	-	22	O&G not analysed, Total TPH analysed instead
ES1109832-002	11 May 2011	A1	9.16	1890	16	-	12	O&G not analysed, Total TPH analysed instead
ES1109832-003	11 May 2011	SB1	9.05	4510	114	-	65	O&G not analysed, Total TPH analysed instead
ES1109832-004	11 May 2011	DAM G OR D	9.46	249	33	-	7	O&G not analysed, Total TPH analysed instead
ES1111058-001	25 May 2011	BOX CUT SUMP	8.39	2560	102	-	42	O&G not analysed, Total TPH analysed instead
ES1111058-002	25 May 2011	A1	9.02	1950	14	-	10	O&G not analysed, Total TPH analysed instead
ES1111058-003	25 May 2011	SB1	9.48	2870	296	-	19	O&G not analysed, Total TPH analysed instead
ES1111058-004	25 May 2011	D	8.41	355	7	-	5	O&G not analysed, Total TPH analysed instead
ES1112279-001	8 June 2011	BOX CUT SUMP	8.58	2520	190	-	11	O&G not analysed, Total TPH analysed instead
ES1112279-002	8 June 2011	A1	9	1930	11	-	10	O&G not analysed, Total TPH analysed instead
ES1112279-003	8 June 2011	SB1	9.55	2660	23	-	31	O&G not analysed, Total TPH analysed instead
ES1112279-004	8 June 2011	SD2	8.44	201	8	-	7	O&G not analysed, Total TPH analysed instead
ES1113370-001	21 June 2011	BOX CUT SUMP	8.64	2190	428	-	8	O&G not analysed, Total TPH analysed instead

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1113370-002	21 June 2011	A1	8.89	2000	32	-	9	O&G not analysed, Total TPH analysed instead
ES1113370-003	21 June 2011	SB1	9.5	2620	27	-	32	O&G not analysed, Total TPH analysed instead
ES1113370-004	21 June 2011	D	8.53	350	16	-	5	O&G not analysed, Total TPH analysed instead
ES1114773-001	11 July 2011	BOX CUT SUMP	8.11	2880	336	-	5	O&G not analysed, Total TPH analysed instead
ES1114773-002	11 July 2011	A1	8.8	2080	21	-	10	O&G not analysed, Total TPH analysed instead
ES1114773-003	11 July 2011	SB1	9.42	2650	26	-	28	O&G not analysed, Total TPH analysed instead
ES1114773-004	11 July 2011	SD2	8.34	270	11	-	6	O&G not analysed, Total TPH analysed instead
ES1116217-001	27 July 2011	BOX CUT SUMP	8.21	3340	123	-	9	O&G not analysed, Total TPH analysed instead
ES1116217-002	27 July 2011	A1	8.86	2170	11	-	10	O&G not analysed, Total TPH analysed instead
ES1116217-003	27 July 2011	SB1	9.49	2740	38	-	38	O&G not analysed, Total TPH analysed instead
ES1116217-004	27 July 2011	D	8.63	404	14	-	6	O&G not analysed, Total TPH analysed instead
ES1118568-001	25 August 2011	SD1	8.31	565	122	<5	17	
ES1118568-002	25 August 2011	SD2	8.28	294	<5	<5	6	
ES1118568-003	25 August 2011	SD3	8.45	488	10	<5	5	
ES1118568-004	25 August 2011	SD4	8.56	889	59	<5	7	
ES1118568-005	25 August 2011	SD5	8.12	247	16	<5	8	
ES1118568-006	25 August 2011	SB1	9.5	2470	45	<5	36	
ES1119508-001	7 September 2011	BOX CUT SUMP	8.58	2430	128	-	9	O&G not analysed, Total TPH analysed instead
ES1119508-002	7 September 2011	A1	8.91	2280	28	-	10	O&G not analysed, Total TPH analysed instead
ES1119508-003	7 September 2011	SB1	9.45	2500	80	-	33	O&G not analysed, Total TPH analysed instead
ES1119508-004	7 September 2011	D	8.55	324	36	-	6	O&G not analysed, Total TPH analysed instead
ES1120633-001	21 September 2011	BOX CUT SUMP	8.64	2590	127	-	24	O&G not analysed, Total TPH analysed instead
ES1120633-002	21 September 2011	A1	8.9	2270	64	-	11	O&G not analysed, Total TPH analysed instead
ES1120633-003	21 September 2011	SB1	9.3	1570	466	-	12	O&G not analysed, Total TPH analysed instead
ES1120633-004	21 September 2011	DAM G or D	8.48	398	40	-	2	O&G not analysed, Total TPH analysed instead
ES1122998-001	20 October 2011	BOX CUT SUMP	8.39	2770	156	-	4	O&G not analysed, Total TPH analysed instead
ES1122998-002	20 October 2011	A1	8.72	2510	14	-	6	O&G not analysed, Total TPH analysed instead
ES1122998-003	20 October 2011	SB1	9.33	1560	79	-	13	O&G not analysed, Total TPH analysed instead
ES1122998-004	20 October 2011	D	8.56	355	22	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-001	2 November 2011	BOX CUT SUMP	8.41	4090	43	-	9	O&G not analysed, Total TPH analysed instead
ES1123998-002	2 November 2011	A1	8.8	2520	<5	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-003	2 November 2011	SB1	9.48	2490	79	-	12	O&G not analysed, Total TPH analysed instead
ES1123998-004	2 November 2011	D	8.65	387	8	-	6	O&G not analysed, Total TPH analysed instead
ES1123998-005	2 November 2011	B1	8.91	619	<5	-	7	O&G not analysed, Total TPH analysed instead
ES1125416-001	17 November 2011	SD1	9.16	384	50	<5	12	
ES1125416-002	17 November 2011	SD2	8.21	278	31	<5	6	
ES1125416-003	17 November 2011	SD3	7.98	343	28	<5	10	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1125416-004	17 November 2011	SD4	8.09	446	132	<5	7	
ES1125416-005	17 November 2011	SD5	7.48	171	332	<5	9	
ES1125416-006	17 November 2011	SB1	9.26	1700	45	<5	6	
ES1126011-001	24 November 2011	BOX CUT SUMP	8.26	2740	336	-	34	O&G not analysed, Total TPH analysed instead
ES1126011-002	24 November 2011	A1	8.83	2390	34	-	6	O&G not analysed, Total TPH analysed instead
ES1126011-003	24 November 2011	D	8.55	392	10	-	6	O&G not analysed, Total TPH analysed instead
ES1127641-001	13 December 2011	BOX CUT SUMP	8.57	2020	94	-	8	O&G not analysed, Total TPH analysed instead
ES1127641-002	13 December 2011	A1	9	1930	30	-	5	O&G not analysed, Total TPH analysed instead
ES1127641-003	13 December 2011	SB1	8.7	605	154	-	<1	O&G not analysed, Total TPH analysed instead
ES1127641-004	13 December 2011	D	8.63	354	11	-	6	O&G not analysed, Total TPH analysed instead
ES1201147-001	18 January 2012	A1	9.06	2200	12	<5	6	
ES1201147-002	18 January 2012	A2	9.29	1900	30	<5	13	
ES1201147-003	18 January 2012	A3	9.77	4960	44	<5	26	
ES1201147-004	18 January 2012	B1	8.72	545	10	<5	<1	
ES1201147-005	18 January 2012	B2	9.06	13400	47	<5	16	
ES1201147-006	18 January 2012	C	9.3	610	90	<5	3	
ES1201147-007	18 January 2012	D	8.58	380	18	<5	2	
ES1201539-001	23 January 2012	SB1	9.15	2390	27	<5	3	
ES1201539-002	23 January 2012	SB2	8.16	364	8	-	7	
ES1201539-003	23 January 2012	SB3	8.77	995	28	<5	<1	
ES1201539-004	23 January 2012	SD1	8.09	295	30	<5	7	
ES1201539-005	23 January 2012	SD2	8.01	188	18	<5	5	
ES1201539-006	23 January 2012	SD3	8	235	42	<5	4	
ES1201539-007	23 January 2012	SD4	8.25	269	137	<5	4	
ES1201539-008	23 January 2012	SD5	7.75	168	16	<5	8	
ES1201539-009	23 January 2012	SD6	8.73	1470	2280	<5	8	
ES1204194-001	22 February 2012	A1	9.1	1900	21	<5	2	
ES1204194-002	22 February 2012	A2	9.2	1740	411	<5	7	
ES1204194-003	22 February 2012	A3	9.78	3450	538	<5	15	
ES1204194-004	22 February 2012	B1	8.7	496	300	<5	6	
ES1204194-005	22 February 2012	B2	9.16	12200	59	<5	13	
ES1204194-006	22 February 2012	C	9.29	389	35	<5	11	
ES1204194-007	22 February 2012	D	8.51	358	20	<5	4	
ES1204195-001	22 February 2012	SB1	8.7	718	185	<5	4	
ES1204195-002	22 February 2012	SB2	8.33	462	74	<5	5	
ES1204195-003	22 February 2012	SB3	8.61	596	269	<5	3	
ES1204195-004	22 February 2012	SD1	7.92	371	37	<5	7	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1204195-005	22 February 2012	SD2	8.03	195	52	<5	6	
ES1204195-006	22 February 2012	SD3	7.71	251	132	<5	6	
ES1204195-007	22 February 2012	SD4	7.81	272	32	<5	7	
ES1204195-008	22 February 2012	SD5	7.74	142	48	<5	10	
ES1204195-009	22 February 2012	SD6	8.66	911	392	<5	7	
ES1207056-001	22 March 2012	A1	9.01	1950	20	<5	5	
ES1207056-002	22 March 2012	A2	9.23	1880	14	<5	14	
ES1207056-003	22 March 2012	A3	9.74	3810	33	<5	27	
ES1207056-004	22 March 2012	B1	8.76	512	8	<5	6	
ES1207056-005	22 March 2012	B2	9.15	12600	173	<5	90	
ES1207056-006	22 March 2012	C	9.43	553	20	<5	20	
ES1207056-007	22 March 2012	D	8.62	367	16	<5	5	
ES1207061-003	22 March 2012	SB3	9.41	2330	272	<5	41	SB1 and SB2 not sampled as dams being upgraded
ES1207061-004	22 March 2012	SD1	8.84	415	11	<5	8	
ES1207061-005	22 March 2012	SD2	7.65	202	10	<5	8	
ES1207061-006	22 March 2012	SD3	7.95	275	16	<5	5	
ES1207061-007	22 March 2012	SD4	8.21	269	21	<5	4	
ES1207061-008	22 March 2012	SD5	7.98	154	10	<5	9	
ES1207061-009	22 March 2012	SD6	8.67	1090	332	<5	9	
ES1211544-001	9 May 2012	A1	9.11	2240	20	<5	2	
ES1211544-002	9 May 2012	A2	9.22	2210	10	<5	6	
ES1211544-003	9 May 2012	A3	9.73	4050	65	<5	8	
ES1211544-004	9 May 2012	B1	8.61	486	<5	<5	<1	
ES1211544-005	9 May 2012	B2	9.08	13100	71	<5	71	
ES1211544-006	9 May 2012	C	9.27	820	42	<5	15	
ES1211544-007	9 May 2012	D	8.55	408	20	<5	2	
ES1211544-008	9 May 2012	SB1	9.1	1870	56	<5	<1	SB2 not sampled as dam being upgraded
ES1211545-001	9 May 2012	SB3	9.42	4220	100	<5	42	
ES1211545-002	9 May 2012	SD1	8.64	448	16	<5	3	
ES1211545-003	9 May 2012	SD2	8.29	233	11	<5	4	
ES1211545-004	9 May 2012	SD3	8.39	336	21	<5	3	
ES1211545-005	9 May 2012	SD4	8.45	323	18	<5	3	
ES1211545-006	9 May 2012	SD5	8.09	206	8	<5	7	
ES1211545-007	9 May 2012	SD6	8.71	1280	932	<5	5	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1215409-001	20 June 2012	SB1	9.15	2390	67	<5	7	
ES1215409-002	20 June 2012	SB2	8.3	802	18	<5	23	
ES1215409-003	20 June 2012	SB3	9.14	2960	53	<5	44	
ES1215409-004	20 June 2012	SD1	8	348	8	<5	15	
ES1215409-005	20 June 2012	SD2	8.12	223	<5	<5	9	
ES1215409-006	20 June 2012	SD3	8	339	6	<5	10	
ES1215409-007	20 June 2012	SD4	8.49	331	5	<5	6	
ES1215409-008	20 June 2012	SD5	8.03	182	<5	<5	9	
ES1215409-009	20 June 2012	SD6	8.64	1100	44	<5	17	
ES1215547-001	21 June 2012	A1	9.04	2290	17	<5	11	
ES1215547-002	21 June 2012	A2	9.19	2450	10	<5	14	
ES1215547-003	21 June 2012	A3	9.71	3770	46	<5	43	
ES1215547-004	21 June 2012	B1	8.23	418	<5	<5	5	
ES1215547-005	21 June 2012	B2	9	12800	32	<5	<1	
ES1215547-006	21 June 2012	C	8.97	768	42	<5	16	
ES1215547-007	21 June 2012	D	8.57	385	8	<5	6	
ES1218051-001	23 July 2012	SB1	8.99	2020	58	<5	12	
ES1218051-002	23 July 2012	SB2	8.47	800	19	<5	12	
ES1218051-003	23 July 2012	SB3	9.1	1940	88	<5	34	
ES1218051-004	23 July 2012	SD1	8.15	279	5	<5	13	
ES1218051-005	23 July 2012	SD2	8.09	221	5	<5	9	
ES1218051-006	23 July 2012	SD3	7.59	388	<5	<5	6	
ES1218051-007	23 July 2012	SD4	8.25	363	<5	<5	6	
ES1218051-008	23 July 2012	SD5	8.21	176	<5	<5	9	
ES1218051-009	23 July 2012	SD6	8.6	955	39	<5	8	
ES1218050-001	23 July 2012	A1	8.97	2150	16	<5	12	
ES1218050-002	23 July 2012	A2	9.15	2900	10	<5	11	
ES1218050-003	23 July 2012	A3	9.68	3520	41	<5	32	
ES1218050-004	23 July 2012	B1	8.81	370	<5	<5	3	
ES1218050-005	23 July 2012	B2	8.96	12500	26	<5	14	
ES1218050-006	23 July 2012	C	8.87	640	<5	<5	14	
ES1218050-007	23 July 2012	D	8.55	386	<5	<5	4	
ES1218050-008	23 July 2012	B2 POINT 1	8.96	12300	34	<5	15	
ES1218050-009	23 July 2012	B2 POINT 2	8.96	12600	40	<5	14	
ES1220401-001	21 August 2012	A1	8.84	2280	15	<5	8	
ES1220401-002	21 August 2012	A2	9.08	3430	35	<5	2	
ES1220401-003	21 August 2012	A3	9.47	3760	63	<5	<1	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1220401-004	21 August 2012	B1	8.5	361	<5	<5	<1	
ES1220401-005	21 August 2012	B2 POINT 1	9.17	12200	28	<5	17	
ES1220401-006	21 August 2012	B2 POINT 2	8.92	12900	31	<5	17	
ES1220401-007	21 August 2012	C	9.23	942	42	<5	2	
ES1220401-008	21 August 2012	D	8.72	407	6	<5	3	
ES1220586-001	23 August 2012	SB1	9.01	3120	72	<5	<1	
ES1220586-002	23 August 2012	SB2	8.54	850	58	<5	<1	
ES1220586-003	23 August 2012	SB3	8.96	3350	50	<5	33	
ES1220586-004	23 August 2012	SD1	8.13	299	48	<5	3	
ES1220586-005	23 August 2012	SD2	8.15	228	12	<5	4	
ES1220586-006	23 August 2012	SD3	8.1	378	10	<5	3	
ES1220586-007	23 August 2012	SD4	8.54	396	31	<5	2	
ES1220586-008	23 August 2012	SD5	8.24	192	11	<5	6	
ES1220586-009	23 August 2012	SD6	8.69	1070	376	<5	4	
ES1222949-001	24 September 2012	A1	8.81	2940	9	<5	10	
ES1222949-002	24 September 2012	A2	9.03	4460	20	7	21	
ES1222949-003	24 September 2012	A3	8.73	7720	25	<5	24	
ES1222949-004	24 September 2012	B1	8.6	334	8	<5	2	
ES1222949-005	24 September 2012	B2 POINT 1	8.99	13200	<5	<5	14	
ES1222949-006	24 September 2012	B2 POINT 2	8.99	13400	16	<5	15	
ES1222949-007	24 September 2012	C	8.93	1560	252	<5	41	
ES1222949-008	24 September 2012	D	8.87	422	<5	<5	4	
ES1223081-001	25 September 2012	SB1	8.97	3400	13	<5	6	
ES1223081-002	25 September 2012	SB2	9.09	989	30	<5	12	
ES1223081-003	25 September 2012	SB3	9.1	6350	200	<5	63	
ES1223081-004	25 September 2012	SD1	8.83	343	16	<5	13	
ES1223081-005	25 September 2012	SD2	8.6	264	10	<5	8	
ES1223081-006	25 September 2012	SD3	7.94	488	10	<5	7	
ES1223081-007	25 September 2012	SD4	8.93	505	46	<5	7	
ES1223081-008	25 September 2012	SD5	7.97	226	66	<5	10	
ES1223081-009	25 September 2012	SD6	8.58	1170	160	<5	16	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1224704-001	16 October 2012	A1	8.86	3280	18	<5	<1	
ES1224704-002	16 October 2012	A2	9.04	4780	26	<5	25	
ES1224704-003	16 October 2012	A3	8.55	10300	24	<5	27	
ES1224704-004	16 October 2012	B1	8.72	322	<5	<5	<1	
ES1224704-005	16 October 2012	B2-POINT 1	9.09	12600	42	<5	27	
ES1224704-006	16 October 2012	B2-POINT 2	9.07	13600	35	<5	18	
ES1224704-007	16 October 2012	C	8.83	2760	406	<5	91	
ES1224704-008	16 October 2012	D	8.76	424	26	<5	<1	
ES1224703-001	16 October 2012	SB1	9.03	3760	59	<5	25	
ES1224703-002	16 October 2012	SB2	8.8	1070	32	<5	7	
ES1224703-003	16 October 2012	SB3	9.28	9020	220	<5	106	
ES1224703-004	16 October 2012	SD1	9.54	330	11	<5	13	
ES1224703-005	16 October 2012	SD2	8.01	263	72	<5	5	
ES1224703-006	16 October 2012	SD3	8.33	455	20	<5	7	
ES1224703-007	16 October 2012	SD4	9.22	721	167	<5	6	
ES1224703-008	16 October 2012	SD5	8.48	243	50	<5	6	
ES1224703-009	16 October 2012	SD6	8.81	1300	50	<5	<1	
ES1227721-001	21 November 2012	B1	8.73	322	<5	<5	3	
ES1227721-002	21 November 2012	B2 POINT 1	9.21	14500	20	<5	3	
ES1227721-003	21 November 2012	B2 POINT 2	9.2	14500	22	<5	7	
ES1228045-001	26 November 2012	A1	8.91	4190	35	<5	4	
ES1228045-002	26 November 2012	A2	9.06	6770	42	<5	30	
ES1228045-003	26 November 2012	A3	8.61	12300	20	<5	15	
ES1228136-001	27 November 2012	D	8.48	397	29	<5	5	
ES1228137-001	27 November 2012	SB1	9.18	4850	101	<5	14	
ES1228137-002	27 November 2012	SB2	9.48	1430	10	<5	13	
ES1228137-003	27 November 2012	SD1	8.51	435	26	<5	12	
ES1228137-004	27 November 2012	SD2	8.39	335	40	<5	8	
ES1228137-005	27 November 2012	SD3	8.67	546	14	<5	6	
ES1228137-006	27 November 2012	SD5	8.23	296	40	<5	10	
ES1228137-007	27 November 2012	SD6	8.89	1500	126	<5	11	

Sample No.	Date	Sample Location	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1229976-001	18 December 2012	A1	9.13	4940	38	<5	25	
ES1229976-002	18 December 2012	A2	9.05	9840	80	<5	49	
ES1229976-003	18 December 2012	A3	8.76	12100	43	<5	459	
ES1229976-004	18 December 2012	B1	8.58	345	5	<5	5	
ES1229976-005	18 December 2012	B2-POINT 1	9.24	13700	67	<5	17	
ES1229976-006	18 December 2012	B2-POINT 2	9.25	14500	64	<5	18	
ES1229976-008	18 December 2012	D	8.65	452	32	<5	27	
ES1229977-001	18 December 2012	SB1	9.29	3930	72	<5	27	
ES1229977-002	18 December 2012	SB2	9.46	1870	14	<5	23	
ES1229977-003	18 December 2012	SD1	9.15	462	29	<5	19	
ES1229977-004	18 December 2012	SD2	8.56	382	84	<5	10	
ES1229977-005	18 December 2012	SD3	8.52	573	65	<5	11	
ES1229977-006	18 December 2012	SD5	8.38	314	41	<5	14	
ES1229977-007	18 December 2012	SD6	8.91	1600	52	<5	26	
ES1301112-001	16 January 2013	A1	9.31	5330	50	56	15	
ES1301112-002	16 January 2013	A2	9.33	13800	44	<5	50	
ES1301112-003	16 January 2013	A3	8.89	13900	28	<5	18	
ES1301112-004	16 January 2013	B1	9.04	382	<5	<5	4	
ES1301112-005	16 January 2013	B2 - POINT 1	9.51	16000	71	<5	21	
ES1301112-006	16 January 2013	B2 - POINT 2	9.54	16200	63	<5	20	
ES1301112-007	16 January 2013	D	9.11	515	84	<5	9	
ES1303170-001	8 February 2013	SB1	9.03	2110	1210	<5	4	
ES1303170-002	8 February 2013	SB2	9.57	1250	736	<5	13	
ES1303170-003	8 February 2013	SB3	8.43	827	460	<5	3	
ES1303170-004	8 February 2013	SD1	7.59	175	146	<5	13	
ES1303170-005	8 February 2013	SD2	8.04	154	182	<5	9	
ES1303170-006	8 February 2013	SD3	7.86	338	28	<5	14	
ES1303170-007	8 February 2013	SD4	8.07	281	258	<5	8	
ES1303170-008	8 February 2013	SD5	7.58	125	20	<5	11	
ES1303170-009	8 February 2013	SD6	8.89	1220	768	<5	6	
ES1304586-001	27 February 2013	A1	9.09	4340	31	<5	12	
ES1304586-002	27 February 2013	A2	9.19	14600	49	<5	63	
ES1304586-003	27 February 2013	A3	8.99	13600	25	<5	18	
ES1304586-004	27 February 2013	B1	8.62	359	<5	<5	7	
ES1304586-005	27 February 2013	B2 - POINT 1	9.48	12400	101	<5	32	
ES1304586-006	27 February 2013	B2 - POINT 2	9.48	15400	117	<5	31	
ES1304586-007	27 February 2013	C	9.15	672	344	<5	13	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1304586-008	27 February 2013	D	8.67	434	24	<5	8	
ES1304712-001	28 February 2013	SB1	9.09	4870	24	<5	7	
ES1304712-002	28 February 2013	SB2	9.58	1400	8	<5	8	
ES1304712-003	28 February 2013	SB3	8.89	1720	1060	<5	3	
ES1304712-004	28 February 2013	SD1	7.83	258	14	<5	16	
ES1304712-005	28 February 2013	SD2	8.04	171	16	<5	10	
ES1304712-006	28 February 2013	SD3	8.01	288	26	<5	11	
ES1304712-007	28 February 2013	SD4	9.11	399	66	<5	8	
ES1304712-008	28 February 2013	SD5	7.96	161	103	<5	10	
ES1304712-009	28 February 2013	SD6	8.89	1240	500	<5	12	
ES1308252-001	9 April 2013	A1	8.87	4800	22	<5	21	
ES1308252-002	9 April 2013	A2	9.08	15600	48	<5	135	
ES1308252-003	9 April 2013	A3	9.04	14200	18	<5	163	
ES1308252-004	9 April 2013	B1	8.38	270	<5	<5	4	
ES1308252-005	9 April 2013	B2 - POINT 1	7.00	7370	34	<5	1200	
ES1308252-008	9 April 2013	B2 - POINT 2	9.47	15500	35	<5	42	
ES1308252-006	9 April 2013	C	9.32	1090	418	<5	30	
ES1308252-007	9 April 2013	D	8.55	367	18	<5	8	
ES1308403-001	10 April 2013	SB1	9.06	5450	13	<5	17	
ES1308403-002	10 April 2013	SB2	9.23	1300	66	<5	9	
ES1308403-003	10 April 2013	SB3	8.8	2360	129	<5	10	
ES1308403-004	10 April 2013	SD1	8.02	286	29	<5	10	
ES1308403-005	10 April 2013	SD2	8.01	194	41	<5	8	
ES1308403-006	10 April 2013	SD3	7.97	327	36	<5	9	
ES1308403-007	10 April 2013	SD4	8.33	372	32	<5	7	
ES1308403-008	10 April 2013	SD6	8.73	1150	448	<5	10	
ES1312071-001	27 May 2013	SB1	9.00	4730	10	<5	105	
ES1312071-002	27 May 2013	SB2	8.97	1420	6	<5	4	
ES1312071-003	27 May 2013	SD3	8.61	380	<5	<5	10	
ES1312071-004	27 May 2013	SD4	8.74	463	10	<5	8	
ES1312069-001	27 May 2013	A1	8.77	4280	20	<5	48	
ES1312069-002	27 May 2013	A2	8.89	16800	98	<5	53	
ES1312069-003	27 May 2013	A3	9.09	14900	26	<5	<1	
ES1312069-004	27 May 2013	B1	8.07	177	<5	<5	<1	
ES1312069-005	27 May 2013	B2	9.45	15200	34	<5	34	
ES1312069-006	27 May 2013	C	9.18	1450	860	<5	75	
ES1312069-007	27 May 2013	D	8.74	409	14	<5	8	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1312189-001	28 May 2013	SD1	8.01	350	23	<5	9	
ES1312189-002	28 May 2013	SD2	8.11	224	18	<5	10	
ES1312189-003	28 May 2013	SB3	8.97	3460	52	<5	18	
ES1312189-004	28 May 2013	SD5	7.98	200	<5	<5	11	
ES1312189-005	28 May 2013	SD6	8.73	1290	18	<5	45	
ES1314538-001	26 June 2013	SB1	8.99	4310	<5	<5	4	
ES1314538-002	26 June 2013	SB2	8.88	1200	<5	<5	11	
ES1314538-003	26 June 2013	SB3	9.01	2730	36	<5	14	
ES1314538-004	26 June 2013	SD3	8.45	370	<5	<5	8	
ES1314538-005	26 June 2013	SD4	8.75	603	7	<5	9	
ES1314538-006	26 June 2013	SD6	8.74	1170	37	<5	43	
ES1314537-001	26 June 2013	A1	8.7	4410	11	<5	6	
ES1314537-002	26 June 2013	A2	9.02	16400	68	<5	41	
ES1314537-003	26 June 2013	A3	9.23	14400	11	<5	52	
ES1314537-004	26 June 2013	B1	8.26	153	<5	<5	2	
ES1314537-005	26 June 2013	B2	9.56	14300	18	<5	33	
ES1314537-006	26 June 2013	C	8.87	920	275	<5	78	
ES1314537-007	26 June 2013	D	8.67	391	12	<5	10	
ES1314684-001	27 June 2013	SD1	8.24	344	8	<5	10	
ES1314684-002	27 June 2013	SD2	8.29	223	14	<5	8	
ES1314684-003	27 June 2013	SD5	8.01	199	8	<5	8	
ES1316995-001	29 July 2013	A1	8.84	5050	19	<5	11	
ES1316995-002	29 July 2013	A2	8.97	16300	58	<5	55	
ES1316995-003	29 July 2013	A3	9.22	14700	37	<5	23	
ES1316995-004	29 July 2013	B1	7.84	170	<5	<5	3	
ES1316995-005	29 July 2013	B2	9.56	13800	18	<5	33	
ES1316995-006	29 July 2013	C	8.93	953	319	<5	82	
ES1316995-007	29 July 2013	D	8.53	398	<5	<5	10	
ES1317064-001	30 July 2013	SB1	8.87	5130	18	<5	4	
ES1317064-002	30 July 2013	SB2	8.85	1170	<5	<5	10	
ES1317064-003	30 July 2013	SB3	9.07	2460	106	<5	10	
ES1317064-004	30 July 2013	SD1	8.33	367	12	<5	9	
ES1317064-005	30 July 2013	SD2	8.53	248	21	<5	10	
ES1317064-006	30 July 2013	SD3	8.96	380	6	<5	8	
ES1317064-007	30 July 2013	SD4	9.29	823	<5	<5	8	
ES1317064-008	30 July 2013	SD5	8.36	211	6	<5	11	
ES1317064-009	30 July 2013	SD6	8.74	1150	24	<5	38	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1318659-001	21 August 2013	A1	8.82	5530	15	<5	6	
ES1318659-002	21 August 2013	A2	9.32	16600	68	22	50	
ES1318659-003	21 August 2013	A3	9.34	14800	26	<5	834	
ES1318659-004	21 August 2013	B1	8.4	261	<5	<5	9	
ES1318659-005	21 August 2013	B2	9.82	13600	18	<5	21	
ES1318659-006	21 August 2013	C	8.88	1370	381	<5	128	
ES1318659-007	21 August 2013	D	8.47	441	8	<5	10	
ES1318754-001	22 August 2013	SB2	8.91	1160	<5	<5	10	
ES1318754-002	22 August 2013	SD1	8.87	359	6	<5	11	
ES1318754-003	22 August 2013	SD6	8.86	1180	43	<5	36	
ES1318754-004	22 August 2013	SD2	8.47	256	<5	<5	11	
ES1318754-005	22 August 2013	SB3	9.15	3180	14	<5	26	
ES1318754-007	22 August 2013	SD5	8.13	220	6	<5	12	
ES1318754-008	22 August 2013	SD4	9.6	843	9	<5	10	
ES1318754-009	22 August 2013	SB1	9.02	5870	31	<5	9	
ES1318754-010	22 August 2013	SD3	9.62	335	<5	<5	9	
ES1320728-004	18 September 2013	A1	8.94	5290	11	<5	4	
ES1320728-002	18 September 2013	A2	8.93	17300	63	<5	50	
ES1320728-006	18 September 2013	A3	9.17	15600	28	<5	20	
ES1320728-005	18 September 2013	B1	8.64	456	<5	<5	4	
ES1320728-001	18 September 2013	B2	9.48	13800	11	<5	18	
ES1320728-007	18 September 2013	C	9.12	2160	1440	<5	224	Almost empty
ES1320728-003	18 September 2013	D	8.7	604	8	<5	7	
ES1321341-001	26 September 2013	SB1	8.98	2250	122	<5	11	
ES1321341-002	26 September 2013	SB2	9.17	1260	<5	<5	26	
ES1321341-003	26 September 2013	SB3	9.26	5310	9	<5	246	
ES1321341-004	26 September 2013	SD1	9.2	327	28	<5	10	
ES1321341-005	26 September 2013	SD2	8.65	293	24	<5	7	
ES1321341-006	26 September 2013	SD3	9.76	348	11	<5	4	
ES1321341-007	26 September 2013	SD4	8.75	1020	13	<5	27	
ES1321341-008	26 September 2013	SD5	8.38	261	11	<5	14	
ES1321341-009	26 September 2013	SD6	8.85	1300	72	<5	55	

Sample No.	Date	Sample Location	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1322968-004	22 October 2013	A1	9.03	5870	33	<5	<1	
ES1322968-002	22 October 2013	A2	9.2	17600	56	<5	160	
ES1322968-006	22 October 2013	A3	9.45	20800	219	<5	120	Water level low
ES1322968-005	22 October 2013	B1	8.74	612	<5	<5	6	Water level low
ES1322968-001	22 October 2013	B2	9.6	13900	40	<5	121	
ES1322968-003	22 October 2013	D	8.35	770	35	<5	<1	
ES1323072-008	23 October 2013	SB1	9.13	6390	72	<5	3	
ES1323072-001	23 October 2013	SB2	9.46	1500	20	<5	15	
ES1323072-005	23 October 2013	SB3	9.38	7330	63	<5	52	
ES1323072-002	23 October 2013	SD1	8.63	420	25	<5	17	
ES1323072-004	23 October 2013	SD2	8.74	346	14	<5	11	
ES1323072-009	23 October 2013	SD3	9.42	383	36	<5	15	
ES1323072-007	23 October 2013	SD4	9.12	1370	44	<5	13	
ES1323072-006	23 October 2013	SD5	8.49	314	18	<5	14	
ES1323072-003	23 October 2013	SD6	8.81	1460	138	<5	15	
ES1325501-001	21 November 2013	A1	9.03	5850	40	<5	63	
ES1325501-002	21 November 2013	A2	9.29	18100	33	<5	440	
ES1325501-003	21 November 2013	A3	9.26	49700	43	<5	901	
ES1325501-004	21 November 2013	B1	8.71	748	<5	<5	<1	
ES1325501-005	21 November 2013	B2	9.7	13900	46	<5	186	
ES1325501-006	21 November 2013	D	8.36	800	21	<5	<1	
ES1325718-001	25 November 2013	SB1	9.08	4870	11	<5	17	
ES1325718-002	25 November 2013	SB2	9.2	1750	<5	<5	17	
ES1325718-003	25 November 2013	SB3	9.88	11500	25	<5	138	
ES1325718-004	25 November 2013	SD1	8.63	527	28	<5	23	
ES1325718-005	25 November 2013	SD2	8.76	358	14	<5	12	
ES1325718-006	25 November 2013	SD3	8.44	487	24	<5	16	
ES1325718-007	25 November 2013	SD4	8.7	1280	26	<5	13	
ES1325718-008	25 November 2013	SD5	8.5	367	6	<5	12	
ES1325718-009	25 November 2013	SD6	8.79	1570	28	<5	19	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1327337-001	12 December 2013	SB1	9.11	6620	38	<5	4	
ES1327337-002	12 December 2013	SB2	9.55	1910	5	<5	20	Water level low
ES1327337-003	12 December 2013	SB3	9.75	13200	6	<5	16	
ES1327337-004	12 December 2013	SD1	8.48	566	106	<5	38	Water level low
ES1327337-005	12 December 2013	SD2	8.74	407	48	<5	17	
ES1327337-006	12 December 2013	SD3	8.52	558	29	<5	21	
ES1327337-007	12 December 2013	SD4	8.91	1380	27	<5	17	Water level low
ES1327337-008	12 December 2013	SD5	9.22	365	7	<5	17	Water level low
ES1327337-009	12 December 2013	SD6	8.93	1660	12	<5	23	Water level low
ES1327336-001	12 December 2013	A1	9.33	6160	7	<5	6	
ES1327336-002	12 December 2013	A2	9.52	18100	226	9	16	
ES1327336-003	12 December 2013	A3	9.4	50800	25	<5	67	
ES1327336-004	12 December 2013	B1	8.93	1020	<5	<5	8	
ES1327336-005	12 December 2013	B2	9.56	14200	34	<5	<1	
ES1327336-006	12 December 2013	C	9.0	1650	78	<5	68	Water level low
ES1327336-007	12 December 2013	D	8.49	824	11	<5	6	
ES1328231-001	23 December 2013	A1	9.05	6130	28	<5	7	Additional sampling for WTP processing info
ES1328231-002	23 December 2013	A2	9.27	17600	103	<5	17	Additional sampling for WTP processing info
ES1328231-003	23 December 2013	B2	9.63	13900	145	<5	17	Additional sampling for WTP processing info
ES1401408-001	22 January 2014	A1	9.3	7120	22	<5	5	
ES1401408-002	22 January 2014	A2	9.37	18300	156	<5	<1	
ES1401408-003	22 January 2014	A3	9.3	29900	75	<5	328	
ES1401408-004	22 January 2014	B1	8.72	642	<5	<5	<1	
ES1401408-005	22 January 2014	B2	9.72	14600	23	<5	17	
ES1401408-006	22 January 2014	D	8.47	885	16	<5	<1	
ES1401528-001	23 January 2014	SB1	9.33	7440	21	<5	10	
ES1401528-002	23 January 2014	SB2	9.13	2800	293	<5	24	
ES1401528-004	23 January 2014	SD1	8.71	740	48	<5	39	Water level low
ES1401528-005	23 January 2014	SD2	8.54	388	42	<5	16	
ES1401528-006	23 January 2014	SD3	8.36	629	132	<5	29	
ES1401528-007	23 January 2014	SD4	8.87	2960	80	<5	23	
ES1401528-008	23 January 2014	SD5	8.46	577	65	<5	22	
ES1401528-009	23 January 2014	SD6	9.1	1950	146	<5	32	Water level low

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1402739-001	10 February 2014	SB1	9.39	10200	68	<5	17	Water level low
ES1402739-002	10 February 2014	SB2	9.38	4070	48	<5	27	Water level low
ES1402739-003	10 February 2014	SD1	9.27	957	45	<5	42	Water level low
ES1402739-004	10 February 2014	SD2	8.88	744	205	<5	20	Water level low
ES1402739-005	10 February 2014	SD3	8.48	1140	114	<5	28	Water level low
ES1402739-006	10 February 2014	SD4	8.75	6220	440	<5	43	Water level low
ES1402739-007	10 February 2014	SD5	8.64	778	98	<5	26	Water level low
ES1402739-008	10 February 2014	SD6	9.13	2320	72	<5	40	
ES1402847-001	11 February 2014	A1	9.28	7590	166	<5	16	
ES1402847-002	11 February 2014	A2	9.49	18600	74	<5	<1	
ES1402847-003	11 February 2014	A3	9.5	30500	54	<5	<1	
ES1402847-004	11 February 2014	B1	8.91	426	12	<5	<1	
ES1402847-005	11 February 2014	B2	9.87	15000	70	<5	<1	
ES1402847-006	11 February 2014	D	8.67	879	25	<5	<1	
ES1406048-001	19 March 2014	A1	9.14	7030	74	<5	30	
ES1406048-002	19 March 2014	A2	9.34	16800	70	<5	20	
ES1406048-003	19 March 2014	A3	9.34	29600	6	<5	34	
ES1406048-005	19 March 2014	B1	9.73	14200	12	<5	26	
ES1406048-004	19 March 2014	B2	8.86	284	24	<5	2	
ES1406048-006	19 March 2014	D	8.49	917	30	<5	4	
ES1406046-001	19 March 2014	SB1	9.27	3580	16	<5	4	
ES1406046-002	19 March 2014	SB2	9.04	4200	237	<5	37	
ES1406046-003	19 March 2014	SD1	8.62	1070	116	<5	81	
ES1406046-004	19 March 2014	SD2	8.94	934	457	<5	55	
ES1406046-005	19 March 2014	SD3	8.49	1350	526	<5	46	
ES1406046-006	19 March 2014	SD5	8.56	930	101	<5	48	
ES1406046-007	19 March 2014	SD6	9.02	2260	11	<5	72	
ES1408043-001	9 April 2014	SB1	8.98	2480	142	<5	6	
ES1408043-002	9 April 2014	SB2	8.78	1250	19	<5	<1	
ES1408043-003	9 April 2014	SB3	9.06	4640	19	<5	10	
ES1408043-004	9 April 2014	SD1	7.68	306	10	<5	14	
ES1408043-005	9 April 2014	SD2	7.8	185	11	<5	14	
ES1408043-006	9 April 2014	SD3	7.81	314	24	<5	18	
ES1408043-007	9 April 2014	SD4	7.92	370	10	<5	12	
ES1408043-008	9 April 2014	SD5	7.72	154	18	<5	12	
ES1408043-009	9 April 2014	SD6	9.01	1250	185	<5	17	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1408164-001	10 April 2014	A1	9.07	5040	14	<5	1	
ES1408164-002	10 April 2014	A2	9.38	13700	86	<5	44	
ES1408164-003	10 April 2014	A3	9.28	19400	522	58	159	
ES1408164-004	10 April 2014	B1	8.49	377	14	<5	4	
ES1408164-005	10 April 2014	B2	9.59	12800	120	<5	16	
ES1408164-006	10 April 2014	D	8.4	420	23	<5	9	
ES1410565-001	12 May 2014	A1	8.92	5710	22	<5	4	
ES1410565-002	12 May 2014	A2	9.38	15600	<5	<5	24	
ES1410565-003	12 May 2014	A3	9.38	23100	17	<5	42	
ES1410565-004	12 May 2014	B1	8.43	250	<5	<5	2	
ES1410565-005	12 May 2014	B2	9.75	13500	16	<5	21	
ES1410565-006	12 May 2014	D	8.33	444	<5	<5	6	
ES1410708-001	13 May 2014	SB1	8.99	5810	22	<5	10	
ES1410708-002	13 May 2014	SB2	9.19	1400	28	<5	14	
ES1410708-003	13 May 2014	SB3	9.19	7060	18	<5	15	
ES1410708-004	13 May 2014	SD1	8.22	410	9	<5	11	
ES1410708-005	13 May 2014	SD2	8.29	234	20	<5	10	
ES1410708-006	13 May 2014	SD3	8.14	377	14	<5	11	
ES1410708-007	13 May 2014	SD4	8.28	465	46	<5	9	
ES1410708-008	13 May 2014	SD5	8.11	222	22	<5	12	
ES1410708-009	13 May 2014	SD6	8.82	1330	66	<5	35	
ES1413953-001	24 June 2014	A1	8.74	6070	20	<5	5	
ES1413953-002	24 June 2014	A2	9.01	15600	20	<5	67	
ES1413953-003	24 June 2014	A3	9.22	18900	57	<5	88	
ES1413953-004	24 June 2014	B1	8.51	258	<5	<5	2	
ES1413953-005	24 June 2014	B2	9.50	12900	28	<5	81	
ES1413953-006	24 June 2014	C	9.45	20000	<5	<5	123	
ES1413953-007	24 June 2014	D	8.65	468	<5	<5	6	
ES1413954-001	24 June 2014	SB1	8.97	5810	10	<5	6	
ES1413954-002	24 June 2014	SB2	9.06	1260	11	<5	10	
ES1413954-003	24 June 2014	SB3	9.28	4700	14	<5	19	
ES1413954-004	24 June 2014	SD1	8.05	376	<5	<5	11	
ES1413954-005	24 June 2014	SD2	8.2	234	14	<5	8	
ES1413954-006	24 June 2014	SD3	8.19	346	<5	<5	12	
ES1413954-007	24 June 2014	SD4	8.37	639	<5	<5	8	
ES1413954-008	24 June 2014	SD5	8.18	227	<5	<5	11	
ES1413954-009	24 June 2014	SD6	8.8	1230	<5	<5	19	

Sample No.	Date	Sample Location	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1415997-001	21 July 2014	A1	8.8	6600	34	<5	5	
ES1415997-002	21 July 2014	A2	9.11	16000	34	<5	6	
ES1415997-003	21 July 2014	A3	9.32	20000	48	<5	1	
ES1415997-004	21 July 2014	B1	8.33	225	5	<5	<1	
ES1415997-005	21 July 2014	B2	9.56	13200	28	<5	29	
ES1415997-006	21 July 2014	C	9.43	18800	14	<5	65	
ES1415997-007	21 July 2014	D	8.63	507	<5	<5	<1	
ES1416084-001	22 July 2014	SB1	9	6840	14	<5	4	
ES1416084-002	22 July 2014	SB2	8.99	1400	<5	<5	9	
ES1416084-003	22 July 2014	SB3	9.31	5560	10	<5	28	
ES1416084-004	22 July 2014	SD1	8.46	417	12	<5	11	
ES1416084-005	22 July 2014	SD2	8.59	261	<5	<5	9	
ES1416084-006	22 July 2014	SD3	8.14	406	<5	<5	12	
ES1416084-007	22 July 2014	SD4	8.5	763	<5	<5	8	
ES1416084-008	22 July 2014	SD5	8.34	259	<5	<5	11	
ES1416084-009	22 July 2014	SD6	8.81	1400	<5	<5	33	
ES1417927-001	13 August 2014	A1	8.92	6970	13	<5	6	
ES1417927-002	13 August 2014	A2	9.23	17500	21	<5	39	
ES1417927-003	13 August 2014	A3	9.49	22900	28	<5	41	
ES1417927-004	13 August 2014	B1	8.7	336	<5	<5	<1	
ES1417927-005	13 August 2014	B2	9.80	14400	16	<5	22	
ES1417927-006	13 August 2014	C	9.66	20600	<5	<5	50	
ES1417927-007	13 August 2014	D	8.71	516	<5	<5	<1	
ES1418092-001	14 August 2014	SB1	8.97	7120	13	<5	11	
ES1418092-002	14 August 2014	SB2	9.09	1370	<5	<5	8	
ES1418092-003	14 August 2014	SB3	9.26	8580	<5	<5	57	
ES1418092-004	14 August 2014	SD1	8.24	429	10	<5	12	
ES1418092-005	14 August 2014	SD2	8.51	276	<5	<5	10	
ES1418092-006	14 August 2014	SD3	9.1	390	<5	<5	11	
ES1418092-007	14 August 2014	SD4	8.87	797	<5	<5	9	
ES1418092-008	14 August 2014	SD5	8.48	275	9	<5	14	
ES1418092-009	14 August 2014	SD6	8.81	1370	6	<5	38	

Sample No.	Date	Sample Location	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1421433-001	19 September 2014	A1	8.73	6440	8	6	6	
ES1421433-002	19 September 2014	A2	9.11	16700	870	5	5	
ES1421433-003	19 September 2014	A3	9.54	34500	54	48	48	
ES1421433-004	19 September 2014	B1	8.87	490	<5	<5	<5	
ES1421433-005	19 September 2014	B2	9.71	13700	49	<5	<5	
ES1421433-006	19 September 2014	C	9.45	21400	38	6	<1	
ES1421433-007	19 September 2014	D	8.58	555	<5	7	5	
ES1421434-001	19 September 2014	SB1	9.11	6800	13	6	<1	
ES1421434-002	19 September 2014	SB2	9.13	1300	<5	<5	8	
ES1421434-003	19 September 2014	SB3	9.23	4820	12	<5	18	
ES1421434-004	19 September 2014	SD1	8.06	322	8	<5	10	
ES1421434-005	19 September 2014	SD2	8.24	263	7	<5	8	
ES1421434-006	19 September 2014	SD3	8.28	364	6	7	11	
ES1421434-007	19 September 2014	SD4	8.85	754	<5	6	8	
ES1421434-008	19 September 2014	SD5	8.08	176	<5	<5	9	
ES1421434-009	19 September 2014	SD6	8.7	1280	12	<5	14	
ES1423149-001	21 October 2014	A1	8.88	6550	<5	<5	3	
ES1423149-002	21 October 2014	A2	9.56	18700	530	9	355	Pond low/strong odour
ES1423149-003	21 October 2014	A3	9.56	52900	739	<5	666	Pond low/strong odour
ES1423149-004	21 October 2014	B1	8.68	526	<5	<5	2	
ES1423149-005	21 October 2014	B2	9.74	14500	56	<5	<1	
ES1423149-006	21 October 2014	C	9.39	21400	28	<5	57	
ES1423149-007	21 October 2014	D	8.54	682	<5	<5	4	
ES1423569-001	24 October 2014	SB1	9.17	6570	41	<5	10	
ES1423569-002	24 October 2014	SB2	9.1	1390	7	<5	8	
ES1423569-003	24 October 2014	SB3	9.19	6860	137	<5	68	
ES1423569-004	24 October 2014	SD1	8.03	382	<5	<5	10	
ES1423569-005	24 October 2014	SD2	8.35	296	18	<5	10	
ES1423569-006	24 October 2014	SD3	8.27	406	6	<5	10	
ES1423569-007	24 October 2014	SD4	8.87	863	18	<5	11	
ES1423569-008	24 October 2014	SD5	8.25	226	14	<5	13	
ES1423569-009	24 October 2014	SD6	8.78	1380	45	<5	34	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1425611-001	19 November 2014	A1	9.09	6980	<5	<5	<1	
ES1425611-002	19 November 2014	A2	9.69	23200	2500	<5	1050	Could not filter sample, rotten odour, high EC
ES1425611-003	19 November 2014	A3	9.66	77200	288	7	399	Rotten odour, high EC
ES1425611-004	19 November 2014	B1	8.97	508	<5	<5	3	
ES1425611-005	19 November 2014	B2	9.79	16200	68	<5	19	
ES1425611-006	19 November 2014	C	9.55	23200	37	<5	32	High EC
ES1425611-007	19 November 2014	D	8.69	736	<5	<5	3	
ES1425870-001	20 November 2014	SB1	9.26	7790	62	<5	<1	
ES1425870-002	20 November 2014	SB2	9.23	1680	12	<5	9	
ES1425870-003	20 November 2014	SB3	9.45	11200	19	<5	73	
ES1425870-004	20 November 2014	SD3	9.15	429	24	<5	11	
ES1425870-005	20 November 2014	SD4	8.98	1130	18	<5	8	
ES1425870-006	20 November 2014	SD5	8.44	301	40	<5	9	
ES1425870-007	20 November 2014	SD6	8.94	1580	22	<5	12	
ES1426134-001	25 November 2014	SD1	8.37	476	11	<5	8	
ES1426134-002	25 November 2014	SD2	8.6	367	12	<5	6	
ES1427456-001	9 December 2014	A1	9.15	6950	25	<5	6	
ES1427456-002	9 December 2014	A2	9.99	17900	564	<5	6	Very low levels, unable to be field filtered
ES1427456-003	9 December 2014	A3	9.82	75800	2420	<5	8940	Very low levels, unable to be field filtered
ES1427456-004	9 December 2014	B1	8.72	505	20	<5	5	
ES1427456-005	9 December 2014	B2	9.89	16900	131	<5	521	
ES1427456-006	9 December 2014	C	9.43	23400	89	<5	1270	
ES1427456-007	9 December 2014	D	8.38	686	33	<5	4	
ES1427589-001	10 December 2014	SB1	9.26	4120	31	<5	<1	
ES1427589-002	10 December 2014	SB2	9.31	1790	28	<5	10	
ES1427589-003	10 December 2014	SB3	9.68	15300	68	<5	128	
ES1427589-004	10 December 2014	SD1	8.37	483	20	<5	12	
ES1427589-005	10 December 2014	SD2	8.66	370	17	<5	7	
ES1427589-006	10 December 2014	SD3	8.81	462	31	<5	12	
ES1427589-007	10 December 2014	SD4	9.28	1220	23	<5	10	
ES1427589-008	10 December 2014	SD5	8.56	336	21	<5	9	
ES1427589-009	10 December 2014	SD6	8.93	1610	16	<5	17	
ES1500920-001	15 January 2015	BOX CUT SUMP	8.77	7160	242	<5	<1	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1501810-001	27 January 2015	SB1	9.25	7980	48	7	<1	
ES1501810-002	27 January 2015	SB2	9.24	2320	31	6	12	
ES1501810-003	27 January 2015	SB3	9.74	21100	60	6	150	
ES1501810-004	27 January 2015	SD1	8.27	591	125	5	16	
ES1501810-005	27 January 2015	SD2	8.63	467	48	<5	8	
ES1501810-006	27 January 2015	SD3	9.21	553	31	6	15	
ES1501810-007	27 January 2015	SD4	8.93	1570	50	5	12	
ES1501810-008	27 January 2015	SD5	8.81	430	27	6	10	
ES1501810-009	27 January 2015	SD6	9.09	1920	14	<5	23	
ES1504572-001	23 February 2015	A1	9.15	8170	<5	<5	200	
ES1504572-002	23 February 2015	A2	9.73	9940	77	8	363	Water level very low
ES1504572-003	23 February 2015	A3	9.29	20300	17	<5	1820	
ES1504572-004	23 February 2015	B1	8.65	741	<5	<5	12	
ES1504572-005	23 February 2015	B2	9.94	23600	180	5	2360	
ES1504572-006	23 February 2015	C	9.57	26100	23	<5	2160	
ES1504572-007	23 February 2015	D	8.6	883	6	<5	4	
ES1504686-001	25 February 2015	SB1	9.1	8150	135	<5	8	
ES1504686-002	25 February 2015	SB2	9.42	2510	11	5	17	
ES1504686-003	25 February 2015	SB3	9.78	11200	322	<5	108	
ES1504686-004	25 February 2015	SD1	8.49	643	44	<5	15	Water level low
ES1504686-005	25 February 2015	SD2	8.85	472	31	<5	8	
ES1504686-006	25 February 2015	SD3	9.17	546	28	6	15	
ES1504686-007	25 February 2015	SD4	9.1	1650	39	<5	10	
ES1504686-008	25 February 2015	SD5	8.82	482	40	<5	8	
ES1504686-009	25 February 2015	SD6	9.1	1850	15	<5	21	
ES1505066-001	27 February 2015	BOX CUT	8.36	9020	283	<15	386	
ES1507239-001	26 March 2015	SB1	9.16	7800	265	11	134	
ES1507239-002	26 March 2015	SB2	9.77	2180	50	<5	9	
ES1507239-003	26 March 2015	SB3	9.95	12700	44	9	330	
ES1507239-004	26 March 2015	SD1	8.26	440	15	6	18	
ES1507239-005	26 March 2015	SD2	8.3	344	14	<5	16	
ES1507239-006	26 March 2015	SD3	8.74	520	26	<5	17	
ES1507239-007	26 March 2015	SD4	9.01	1500	89	<5	12	
ES1507239-008	26 March 2015	SD5	8.49	417	28	9	12	
ES1507239-009	26 March 2015	SD6	9.04	1910	67	6	32	
ES1507436-001	30 March 2015	BOX CUT	8.5	7010	3590	16	<1	

Sample No.	Date	Sample Location	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1507568-001	31 March 2015	A1	9.13	7450	5	<5	189	
ES1507568-002	31 March 2015	A2	9.73	7840	32	<5	740	
ES1507568-003	31 March 2015	A3	9.09	17000	61	<5	1700	
ES1507568-004	31 March 2015	B1	8.71	647	<5	<5	<1	
ES1507568-005	31 March 2015	B2	9.84	23900	36	<5	22	
ES1507568-006	31 March 2015	C	9.51	25500	28	<5	6	
ES1507568-007	31 March 2015	D	8.4	827	<5	<5	3	
ES1520294-001	22 April 2015	A1	9.04	6520	22	<5	<1	
ES1520294-002	22 April 2015	A2	9.24	6680	14	<5	6	
ES1520294-003	22 April 2015	A3	8.91	13800	72	<5	10	
ES1520294-004	22 April 2015	B1	8.64	680	6	<5	1	
ES1520294-005	22 April 2015	B2	10.10	16800	128	<5	100	
ES1520294-006	22 April 2015	C	9.70	23800	31	<5	40	
ES1520294-007	22 April 2015	D	8.55	652	6	5	<1	
ES1520408-001	23 April 2015	SB1	9.59	2530	88	5	7	
ES1520408-002	23 April 2015	SB2	9.72	1600	13	<5	13	
ES1520408-003	23 April 2015	SB3	9.44	2820	136	6	5	
ES1520408-004	23 April 2015	SD1	7.66	232	19	6	11	
ES1520408-005	23 April 2015	SD2	7.91	239	<5	<5	8	
ES1520408-006	23 April 2015	SD3	7.76	326	13	6	14	
ES1520408-007	23 April 2015	SD4	8.22	748	26	<5	10	
ES1520408-008	23 April 2015	SD5	7.72	183	16	<5	10	
ES1520408-009	23 April 2015	SD6	8.92	1420	46	<5	15	
ES1522286-001	19 May 2015	A1	9.25	6850	20	<5	3	
ES1522286-002	19 May 2015	A2	9.58	6890	31	<5	10	
ES1522286-003	19 May 2015	A3	9.06	14500	21	<5	1310	
ES1522286-004	19 May 2015	B1	8.60	619	<5	<5	6	
ES1522286-005	19 May 2015	B2	10.10	22400	139	<5	2530	Water level low
ES1522286-006	19 May 2015	C	9.72	15400	101	<5	1930	
ES1522286-007	19 May 2015	D	8.65	685	5	<5	7	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1522402-001	20 May 2015	SB1	9.1	7380	19	<5	<1	
ES1522402-002	20 May 2015	SB2	9.71	1650	<5	<5	14	
ES1522402-003	20 May 2015	SB3	9.66	4180	37	8	19	
ES1522402-004	20 May 2015	SD1	8.04	292	22	<5	12	
ES1522402-005	20 May 2015	SD2	9.36	249	6	<5	8	
ES1522402-006	20 May 2015	SD3	7.94	367	18	<5	17	
ES1522402-007	20 May 2015	SD4	8.63	903	10	11	10	
ES1522402-008	20 May 2015	SD5	8.35	236	35	<5	9	
ES1522402-009	20 May 2015	SD6	8.89	1510	7	<5	19	
ES1524645-001	23 June 2015	A1	9.05	6450	14	11	<1	
ES1524645-002	23 June 2015	A2	9.37	6760	32	10	20	
ES1524645-003	23 June 2015	A3	9.01	10200	380	5	52	
ES1524645-004	23 June 2015	B1	8.53	581	<5	<5	3	Small fish in pond
ES1524645-005	23 June 2015	B2	10.10	20800	63	<5	299	
ES1524645-006	23 June 2015	C	9.81	22200	38	6	274	
ES1524645-007	23 June 2015	D	8.38	674	<5	<5	4	
ES1524749-001	24 June 2015	SB1	8.93	6450	38	<5	<1	
ES1524749-002	24 June 2015	SB2	9.67	1470	6	10	14	
ES1524749-003	24 June 2015	SB3	9.46	3540	23	7	17	
ES1524749-004	24 June 2015	SD1	7.86	284	<5	<5	12	
ES1524749-005	24 June 2015	SD2	8.14	251	6	11	8	
ES1524749-006	24 June 2015	SD3	7.67	340	<5	<5	13	
ES1524749-007	24 June 2015	SD4	8.79	851	<5	12	7	
ES1524749-008	24 June 2015	SD5	7.99	216	<5	5	9	
ES1524749-009	24 June 2015	SD6	8.82	1370	6	5	18	
ES1524749-010	24 June 2015	BOX CUT	8.59	7560	4150	20	<1	
ES1527134-001	28 July 2015	SB1	9.09	6550	16	<5	<1	
ES1527134-002	28 July 2015	SB2	9.46	1490	<5	19	18	
ES1527134-003	28 July 2015	SB3	9.23	4040	132	7	36	
ES1527134-004	28 July 2015	SD1	8.02	311	22	6	8	
ES1527134-005	28 July 2015	SD2	8.19	267	5	<5	7	
ES1527134-006	28 July 2015	SD3	8.28	363	<5	16	10	
ES1527134-007	28 July 2015	SD4	9.07	952	<5	<5	10	
ES1527134-008	28 July 2015	SD5	8.25	242	<5	<5	7	
ES1527134-009	28 July 2015	SD6	8.77	1400	<5	<5	21	
ES1527134-011	28 July 2015	BOX CUT	8.73	7140	3860	18	<10	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1527330-001	30 July 2015	A1	9.13	6620	166	6	<1	
ES1527330-002	30 July 2015	A2	9.35	7090	32	9	8	
ES1527330-003	30 July 2015	A3	8.68	8850	5	<5	<1	
ES1527330-004	30 July 2015	B1	8.62	520	<5	<5	<1	
ES1527330-005	30 July 2015	B2	10.30	22200	86	9	74	
ES1527330-006	30 July 2015	C	9.85	23100	43	7	58	
ES1527330-007	30 July 2015	D	8.37	671	6	<5	2	
ES1529288-001	25 August 2015	SD5	6.77	115	57	10	19	
ES1529288-002	25 August 2015	SD2	7.12	98	13	8	15	
ES1529425-001	26 August 2015	SB1	9.33	2560	71	<5	<1	
ES1529425-002	26 August 2015	SB2	9.69	1230	<5	<5	15	
ES1529425-003	26 August 2015	SB3	9.34	3130	16	<5	5	
ES1529425-004	26 August 2015	SD1	7.79	179	31	<5	10	
ES1529425-005	26 August 2015	SD2	7.73	180	58	6	7	
ES1529425-006	26 August 2015	SD3	7.68	463	19	<5	38	
ES1529425-007	26 August 2015	SD4	8.43	485	38	<5	8	
ES1529425-008	26 August 2015	SD5	7.53	104	32	6	8	
ES1529425-009	26 August 2015	SD6	8.77	1220	47	<5	11	
ES1529425-010	26 August 2015	BOX CUT	8.76	5830	175	<5	<1	
ES1529580-001	27 August 2015	A1	9.27	6510	12	<5	221	
ES1529580-002	27 August 2015	A2	9.07	6560	39	<5	6	
ES1529580-003	27 August 2015	A3	8.96	7070	26	7	9	
ES1529580-004	27 August 2015	B1	8.41	435	<5	<5	<1	
ES1529580-005	27 August 2015	B2	10.20	21200	74	6	88	
ES1529580-006	27 August 2015	C	9.67	23600	45	6	55	
ES1529580-007	27 August 2015	D	8.48	590	<5	<5	5	
ES1531925-001	22 September 2015	A1	9.19	6510	7	9	7	
ES1531925-002	22 September 2015	A2	9.02	6830	30	8	5	
ES1531925-003	22 September 2015	A3	9.4	7230	9	6	4	
ES1531925-004	22 September 2015	B1	9.00	405	<5	<5	<1	
ES1531925-005	22 September 2015	B2	10.90	21500	126	<5	60	
ES1531925-006	22 September 2015	C	9.66	22200	14	<5	36	
ES1531925-007	22 September 2015	D	8.76	567	<5	<5	<1	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1532077-001	23 September 2015	SB1	9.16	6990	171	<5	29	
ES1532077-002	23 September 2015	SB2	9.54	1390	21	<5	20	
ES1532077-003	23 September 2015	SB3	9.32	3440	19	<5	18	
ES1532077-004	23 September 2015	SD1	8.22	220	8	<5	9	
ES1532077-005	23 September 2015	SD2	7.43	173	12	<5	9	
ES1532077-006	23 September 2015	SD3	8.39	334	<5	<5	9	
ES1532077-007	23 September 2015	SD4	9.01	668	5	<5	10	
ES1532077-008	23 September 2015	SD5	8.02	124	13	<5	8	
ES1532077-009	23 September 2015	SD6	8.87	1370	14	<5	15	
ES1532077-015	23 September 2015	BOX CUT	8.8	7520	708	<5	32	
ES1534739-001	27 October 2015	SB1	9.31	5860	63	8	2	
ES1534739-002	27 October 2015	SB2	9.55	1500	20	8	21	
ES1534739-003	27 October 2015	SB3	9.48	4770	40	7	27	
ES1534739-004	27 October 2015	SD1	8.13	282	45	10	9	
ES1534739-005	27 October 2015	SD2	8.23	198	23	11	9	
ES1534739-006	27 October 2015	SD3	8.65	384	8	9	9	
ES1534739-007	27 October 2015	SD4	9.69	750	5	10	12	
ES1534739-008	27 October 2015	SD5	8.14	169	27	<5	10	
ES1534739-009	27 October 2015	SD6	8.94	1500	43	9	25	
ES1534739-015	27 October 2015	BOX CUT	8.68	7180	920	27	1	
ES1537283-001	25 November 2015	SB1	9.3	8500	18	<5	<1	
ES1537283-002	25 November 2015	SB2	9.52	1420	<5	<5	18	
ES1537283-003	25 November 2015	SB3	9.49	4530	16	<5	18	
ES1537283-004	25 November 2015	SD1	8.06	297	5	<5	10	
ES1537283-005	25 November 2015	SD2	8.07	236	<5	<5	8	
ES1537283-006	25 November 2015	SD3	7.84	445	72	<5	10	
ES1537283-007	25 November 2015	SD4	8.92	684	30	<5	11	Dam level low, pump on
ES1537283-008	25 November 2015	SD5	8.24	172	62	<5	12	
ES1537283-009	25 November 2015	SD6	8.97	1350	<5	<5	11	
ES1537283-010	25 November 2015	BOX CUT	8.68	7580	1940	<5	<1	
ES1537409-001	26 November 2015	A1	9.26	7240	8	<5	10	
ES1537409-002	26 November 2015	A2	9.04	7860	90	<5	5	
ES1537409-003	26 November 2015	A3	9.22	9500	8	8	7	
ES1537409-004	26 November 2015	B1	8.66	551	6	11	6	
ES1537409-005	26 November 2015	B2	10.40	26600	271	10	92	
ES1537409-006	26 November 2015	C	9.74	23500	57	7	77	
ES1537409-007	26 November 2015	D	8.78	634	32	18	6	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1538530-001	9 December 2015	SB1	9.18	8580	272	<5	118	Earthworks nearby
ES1538530-002	9 December 2015	SB2	9.37	1560	<5	<5	25	
ES1538530-003	9 December 2015	SB3	9.43	5440	13	<5	27	
ES1538530-004	9 December 2015	SD1	8.08	341	<5	<5	12	
ES1538530-005	9 December 2015	SD2	8.35	257	<5	<5	11	
ES1538530-006	9 December 2015	SD3	8.45	459	7	<5	10	
ES1538530-007	9 December 2015	SD4	8.81	832	26	-	15	
ES1538530-008	9 December 2015	SD5	8.01	201	28	-	14	
ES1538530-009	9 December 2015	SD6	9.02	1510	21	<5	28	
ES1538530-010	9 December 2015	BOX CUT	8.64	7300	1830	<5	18	
ES1538584-001	10 December 2015	A1	9.22	7360	<5	28	6	
ES1538584-002	10 December 2015	A2	9.8	7710	124	10	12	
ES1538584-003	10 December 2015	A3	9.05	8760	117	7	11	
ES1538584-004	10 December 2015	B1	8.58	553	<5	<5	9	
ES1538584-005	10 December 2015	B2	10.40	29200	346	11	196	High EC, water level very low
ES1538584-006	10 December 2015	C	9.70	23900	73	6	58	High EC
ES1538584-007	10 December 2015	D	8.49	661	7	<5	7	
	13 January 2016	SB1	-	-	-	-	-	Only black mud, earthworks nearby
ES1600922-001	13 January 2016	SB2	8.97	1590	21	9	19	
ES1600922-002	13 January 2016	SB3	9.41	5370	16	<5	23	
ES1600922-003	13 January 2016	SD1	8.84	463	6	13	11	
ES1600922-004	13 January 2016	SD2	8.96	359	9	<5	8	
ES1600922-005	13 January 2016	SD3	8.45	474	14	<5	9	
ES1600922-006	13 January 2016	SD4	8.65	880	53	10	11	
ES1600922-007	13 January 2016	SD5	8.45	242	8	6	10	
ES1600922-008	13 January 2016	SD6	8.99	1500	9	7	23	
ES1600922-013	13 January 2016	BOX CUT	8.51	5290	2350	13	22	
ES1600970-001	14 January 2016	A1	9.22	7860	<5	<5	6	
ES1600970-002	14 January 2016	A2	9.1	7710	42	<5	9	
ES1600970-003	14 January 2016	A3	9.03	7940	34	<5	8	
ES1600970-004	14 January 2016	B1	8.65	619	<5	<5	5	
ES1600970-005	14 January 2016	B2	10.10	36000	230	<5	3840	
ES1600970-006	14 January 2016	C	9.50	24100	74	6	65	
ES1600970-007	14 January 2016	D	8.56	744	28	<5	7	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
-	17 February 2016	SB1	-	-	-	-	-	Dry
ES1603652-001	17 February 2016	SB2	9.5	4940	28	8	<1	
-	17 February 2016	SB3	-	-	-	-	-	Dry
ES1603652-002	17 February 2016	SD1	8.39	488	32	<5	10	
ES1603652-003	17 February 2016	SD2	8.38	340	32	<5	6	
ES1603652-004	17 February 2016	SD3	5.86	549	40	<5	8	
ES1603652-005	17 February 2016	SD4	8.75	1280	69	<5	5	
ES1603652-006	17 February 2016	SD5	8.41	312	31	<5	8	
ES1603652-007	17 February 2016	SD6	8.98	1640	18	<5	7	
ES1603652-008	17 February 2016	BOX CUT	8.67	8300	1410	13	<1	
ES1603857-001	18 February 2016	A1	9.41	8200	16	10	73	
ES1603857-002	18 February 2016	A2	9.16	8090	25	<5	48	
ES1603857-003	18 February 2016	A3	8.96	8420	47	<5	492	
ES1603857-004	18 February 2016	B1	8.70	688	<5	<5	1	
ES1603857-005	18 February 2016	B2	10.30	62300	50	13	7760	
ES1603857-006	18 February 2016	C	9.84	19900	71	<5	1480	
ES1603857-007	18 February 2016	D	8.54	771	28	12	7	
ES1605303-001	8 March 2016	A1	9.2	8540	<5	50	72	
ES1605303-002	8 March 2016	A2	9.04	8520	43	25	69	
ES1605303-003	8 March 2016	A3	9.3	8430	21	25	66	
ES1605303-004	8 March 2016	B1	8.80	668	5	11	4	
ES1605303-005	8 March 2016	B2	10.10	90100	156	24	1820	
ES1605303-006	8 March 2016	C	9.58	27500	40	27	221	
ES1605303-007	8 March 2016	D	9.05	888	44	16	4	
-	9 March 2016	SB1	-	-	-	-	-	Dry
ES1605414-001	9 March 2016	SB2	9.48	5600	60	23	37	
-	9 March 2016	SB3	-	-	-	-	-	Dry
ES1605414-002	9 March 2016	SD1	8.61	548	48	38	13	
ES1605414-003	9 March 2016	SD2	8.74	394	34	14	8	
ES1605414-004	9 March 2016	SD3	8.82	606	33	16	10	
ES1605414-005	9 March 2016	SD4	9.69	2470	167	11	43	Water level low
ES1605414-006	9 March 2016	SD5	8.5	364	28	12	10	
ES1605414-007	9 March 2016	SD6	9.15	1820	20	19	23	
ES1605414-008	9 March 2016	BOX CUT	8.73	5500	268	28	<1	

Appendix E – *Groundwater Data*

[illegible]

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Site ID	Parameter / Water bore	Date	Time	Depth to Water - mgl	Depth to Stand- mboc	Field Parameters				Total Metals														Mercury (Hg) - mg/L	pH Lab	EC Lab - µS/cm	Major Cations					Major Anions					Total Anions - meq/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N - mg/L	Nitrate as N - mg/L	NOx as N - mg/L	Total Dissolved Solids	Comments											
						pH - Field	EC - Field - µS/cm	Temp - Field - °C	Aluminum (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (Cd) - mg/L	Chromium (Cr) - mg/L	Cobalt (Co) - mg/L	Copper (Cu) - mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn) - mg/L	Nickel (Ni) - mg/L	Vanadium (V) - mg/L	Zinc (Zn) - mg/L	Calcium (Ca) - mg/L				Magnesium (Mg) - mg/L	Sodium (Na) - mg/L	Potassium (K) - mg/L	Total Cations - meq/L	Chloride (Cl) - mg/L	Sulfate (SO4) - mg/L	Hydroxide Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L																			
ANZECC Guideline - stock drinking water																																		0.002	6.23	152	1	2	24	4	1.36	25	4	<1	<1	35	35	1.49		0.14	<0.01	0.08	0.08	105	
P5	NC-1105	28-Mar-12	1030	63.02	63.96	6.8	129	22.7	0.16	<0.001	0.032	<0.001	<0.0001	0.002	0.003	0.026	0.36	0.019	0.003	0.024	<0.01	0.087	<0.0001	6.23	152	1	2	24	4	1.36	25	4	<1	<1	35	35	1.49		0.14	<0.01	0.08	0.08	105												
		25-Jun-12	1050	63.04	63.98	6.4	478	21.2																																															
		11-Sep-12	1115	62.96	63.9	6.36	225	23.5	0.64	<0.001	0.037	<0.001	<0.0001	0.003	0.002	0.006	0.89	0.005	0.031	0.003	<0.01	0.05	<0.0001	6.56	172	2	2	25	4	1.7	33	6	<1	<1	42	42	1.89	<0.01	<0.10	<0.01	0.09	0.09	118												
		06-Dec-12	1110	62.96	63.9	6.48	467	24.8	0.73	<0.001	0.046	<0.001	0.0002	0.004	0.003	0.028	1.43	0.026	0.047	0.003	<0.01	0.125	<0.0001	5.75	139	1	2	24	4	1.36	31	4	<1	<1	16	16	1.28		<0.01	<0.01	0.19	0.19	84												
		03-Apr-13	1130	62.96	63.9	6.28	160	21.6																																															
		04-Jul-13	1350	62.99	63.93	6.21	235	22																																															
		03-Sep-13	1310	63.06	64	5.72	168	22.7	2.05	<0.001	0.07	<0.001	<0.0001	0.005	0.004	0.065	3.32	0.026	0.087	0.005	<0.01	0.165	<0.0001	6.34	175	1	1	28	4	1.45	34	4	<1	<1	22	22	1.48		0.82	<0.01	0.16	0.16	148												
		02-Dec-12	1210	63.02	63.96	5.7	154.7	21.3																																															
		06-Mar-14	1020	63.29	63.93	5.9	243	21	0.56	<0.001	0.036	<0.001	<0.0001	0.012	0.003	0.047	0.92	0.02	0.03	0.009	<0.01	0.12	<0.0001	6.07	221	2	2	31	3	1.69	41	10	<1	<1	26	26	1.88		0.04	<0.01	0.3	0.3	170												
		10-Jun-14	1040	63.03	63.97	6.3	440	20.2																																															
		29-Sep-14	1200	63.04	63.98	6.4	257	22.7	1.07	0.001	0.047	<0.001	<0.0001	0.004	0.004	0.013	1.8	0.008	0.059	0.004	<0.01	0.056	<0.0001	6.03	162	<1	1	26	3	1.29	36	4	<1	<1	17	17	1.44		0.02	<0.01	0.2	0.2	101												
		09-Dec-14	925	62.99	63.93	6.4	322	22.1																																															
		12-Mar-15	1130	63.21	64.15	7	301	24.1	1.23	<0.001	0.047	<0.001	<0.0001	0.006	0.003	0.01	2.01	0.009	0.05	0.006	<0.01	0.1	<0.0001	6.08	218	2	3	35	3	1.95	40	3	<1	<1	24	24	1.67		0.02	<0.01	0.13	0.13	120												
		04-Jun-15	1140	63.03	63.97	7	346	23.5																																															
		09-Sep-15	1130	63.03	63.97	7	195	22.4	0.06	<0.001	0.028	<0.001	<0.0001	0.001	0.002	0.007	0.35	0.009	0.011	0.002	<0.01	0.048	<0.0001	5.97	170	3	3	30	3	1.78	27	6	<1	<1	22	22	1.33	----	0.05	<0.01	0.07	0.07	112												
		09-Dec-15	950	63.03	63.97	6.9	153	21.6																																															
08-Mar-16	9-45	63.08	64.02	6.1	173	22.1	0.06	<0.001	0.03	<0.001	<0.0001	0.001	0.002	0.015	0.09	0.001	0.007	0.002	<0.01	0.072	<0.0001	6.14	146	1	1	23	2	1.18	29	4	<1	<1	16	16	1.22	----	0.03	<0.01	0.14	0.14	100														
P6	GW855	3-Mar-08	1345	62.23	63.00																																																		
		2-Apr-08	1415	50.52	51.29																																																		
		9-May-08	1220	50.59	51.36																																																		
		2-Jun-08	1608	62.23	63.00																																																		
		1-Jul-08	1558	50.57	51.34																																																		
		12-Aug-08	1230	50.62	51.39																																																		
		13-Aug-08	1515	50.63	51.40																																																		
		12-Sep-08	0830	50.53	51.30	7.85	1120	21.2		<0.001	0.057	<0.001	<0.0001	<0.001	<0.001	0.001	0.09	0.004	0.037	<0.001	<0.01	0.007	<0.0001																																
		14-Nov-08	1247	50.55	51.33																																																		
		3-Dec-08	1414	50.44	51.22																																																		
		23-Feb-09	1326	50.48	51.30																																																		
		09-Jun-09	1445			SWL >50				0.003	0.192	<0.001	0.0002	0.004	0.004	0.382	3.62	0.374	0.364	0.016	<0.01	0.967	<0.0001			490	29	8	59	7	4.85	44	<10	<1	<1	171	171	4.66	1.99	<0.01						360									
		24-Aug-09	1500	50.20	51.24	SWL only																																																	
		17-Nov-09	1330	50.32	51.36	7.45	414	25.2		<0.001	0.121	<0.001	0.0001	<0.001	<0.001	0.014	0.52	0.019	0.117	0.005	<0.01	0.07	<0.0001			423	12	4	57	6	3.59	27.2	10.3	<1	<1	137	137	3.72	1.81	0.06						240									
		24-Feb-10	1130	50.36	51.40																																																		
		24-Jun-10	1200	50.29	51.33	7.85	390	19	<0.01	<0.001																																													
2-Sep-10	1425	50.19	51.23	6.93	360	24																																																	
9-Feb-11	1120	50.44	51.48	7.1	355	23.6	<0.01	<0.001																																															
08-Jun-11	1110	50.17	51.21	7.05	327	19.5																																																	
26-Sep-11	1200	50.21	51.25	6.98	321	19.8	0.98	0.006	0.143	<0.001	<0.0001	0.001	0.002	0.026	1.56	0.067	0.51	0.005	<0.01	0.1	<0.0001	6.72	346	12	4	55	6	3.47	24	7	<1	<1	128	128	3.38	1.33	0.15	<0.01	0.06	0.06	213														
4-Jan-12	1130	50.20	51.24	6.76	298	22.5																																																	
28-Mar-12	1130	50.22	51.26	7.45	295	22.5	0.29	<0.001	0.118	<0.001	<0.0001	<0.001	<0.001	0.018	0.42	0.23	0.002	0.016	<0.01	0.067	<0.0001	7	341	15	5	48	7	3.43	26	6	<1	<1	122	122	3.3	1.92	0.17	<0.01	0.19	0.19	196														
25-Jun-12	1200	50.26	51.3	6.93	357	19.9																																																	
11-Sep-12	1230	50.21	51.25	6.87	308	22.8	0.15	<0.001	0.158	<0.001	<0.0001	<0.001	0.003	0.031	0.38	0.017	1.44	0.003	<0.01	0.134	<0.0001	7.23	335	12	5	50	8	3.39	28	6	<1	<1	122	122	3.35	0.53	0.2	<0.01	0.1	0.1	160														
06-Dec-12	1210	50.76	51.18	6.72	310	21.1																																																	
03-Apr-13	1220	50.16	51.2	6.89	362	21.2	0.2	<0.001	0.134	<0.001	<0.0001	0.001	0.001	0.036	0.59	0.021	0.346	0.003	<0.01	0.308	<0.0001																																		

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Site ID	Parameter / Water Bore	Date	Time	Depth to Water- m@gl	Depth to Stand- mbloc	Field Parameters				Total Metals																Major Cations				Total Cations - mg/L	Major Anions							Total Anions- mg/L	Ionic Balance	Ammonia as Nitrogen (N)	Nitrite as N- mg/L	Nitrate as N- mg/L	NOx as N- mg/L	Total Dissolved Solids	Comments																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
						pH - field	EC - field- µS/cm	Temp. Field- °C	Aluminium (Al)- mg/L	Arsenic (As)- mg/L	Barium (Ba)- mg/L	Beryllium (Be)- mg/L	Cadmium (Cd)- mg/L	Chromium Cr)- mg/L	Cobalt (Co)- mg/L	Copper (Cu)- mg/L	Iron (Fe) - mg/L	Lead (Pb) - mg/L	Manganese (Mn)- mg/L	Nickel (Ni)- mg/L	Vanadium (V)- mg/L	Zinc (Zn) - mg/L	Mercury (Hg) - mg/L	pH Lab	EC - Lab - µS/cm	Calcium (Ca)- mg/L	Magnesium (Mg) -mg/L	Sodium (Na)- mg/L	Potassium (K)- mg/L		Chloride (Cl)- mg/L	Sulfate (SO4)- mg/L	Hydroxide (OH)- mg/L	Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
										5	0.5			0.01	1	1	1	0.1						1	20	0.002		1000						1000																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

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■ Denotes dissolved metals

