

NARRABRI MINE

2018 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 2
Name of holder of water licence	Narrabri Coal Pty Ltd, POSCO 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 date	1 January 2017
MOP/RMP end date	30 November 2020
Annual Review Commencement Date	1 January 2018
Annual Review Completion Date	31 December 2018
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 January 2018 to 31st December 2018, 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	28 12 17

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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 January 2018 to 31 December 2018. 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	No
Environment Protection Licence (EPL) 12789	No
Exploration Licence (EL) 6243	Yes
Subsidence Management Plan (SMP) Approval 10/9000	Yes
90CA811347	Yes
90WA812891	Yes
90CA802130	Yes
90WA822539	Yes
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-compliances 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 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	One noise exceedance was recorded at Site N3 on 13 March 2018. Dozer track noise and conveyor noise continuum were noted as the dominant noise sources from the mine. No community complaints were received at the time of the exceedance and no alarms were triggered on nearby noise units. The relevant Government agencies were notified at the time as required by the NMP.	Sections 6.1 & 11
	Schedule 4, Condition 4	Failure to implement the Noise Management Plan (NMP).	Non-compliant	The mine reported SPL's which exceeded those identified in the NMP. The DP&E requested additional information in October 2018 which the mine provided. The DP&E issued a Warning Letter in December 2018.	Section 11.3
EPL 12789	Condition L3.1	Noise generated at the premises must not exceed the noise limits in the table below.	Non-compliant	See above PA 08_0144 Schedule 4, Condition 1.	Sections 6.1 & 11
ML 1609	Condition 3(a)	Mining operations must not be carried out otherwise than accordance with a Mining Operations Plan (MOP) which has been approved by the Director - General of the Department of Primary Industries.	Non-compliant	The mine commenced additional testing of the Reject Emplacement Area (REA) during the reporting period but this was not completed within 12 months, i.e. by 28 November 2018.	Section 11

2 INTRODUCTION

This is the twelfth Annual Review produced for the Narrabri Mine (Figure 1) 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 Resources Regulator under the Narrabri Mine Mining Lease (ML) 1609; and
- the routine reporting expectations of DPI-Water.

Though primarily covering the period from 1 January 2018 to 31 December 2018 (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 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.
- Brian Williams – Mining Engineering Manager, retains statutory responsibility for the mine. Contact: (02) 6794 4755.
- Brad Elvy – Technical Services Manager, retains responsibility for technical aspects of the operation. Contact (02) 6794 4755.
- Steve Farrar – Environmental Consultant, oversees day to day environmental performance across the site. Contact: (02) 6794 4755.

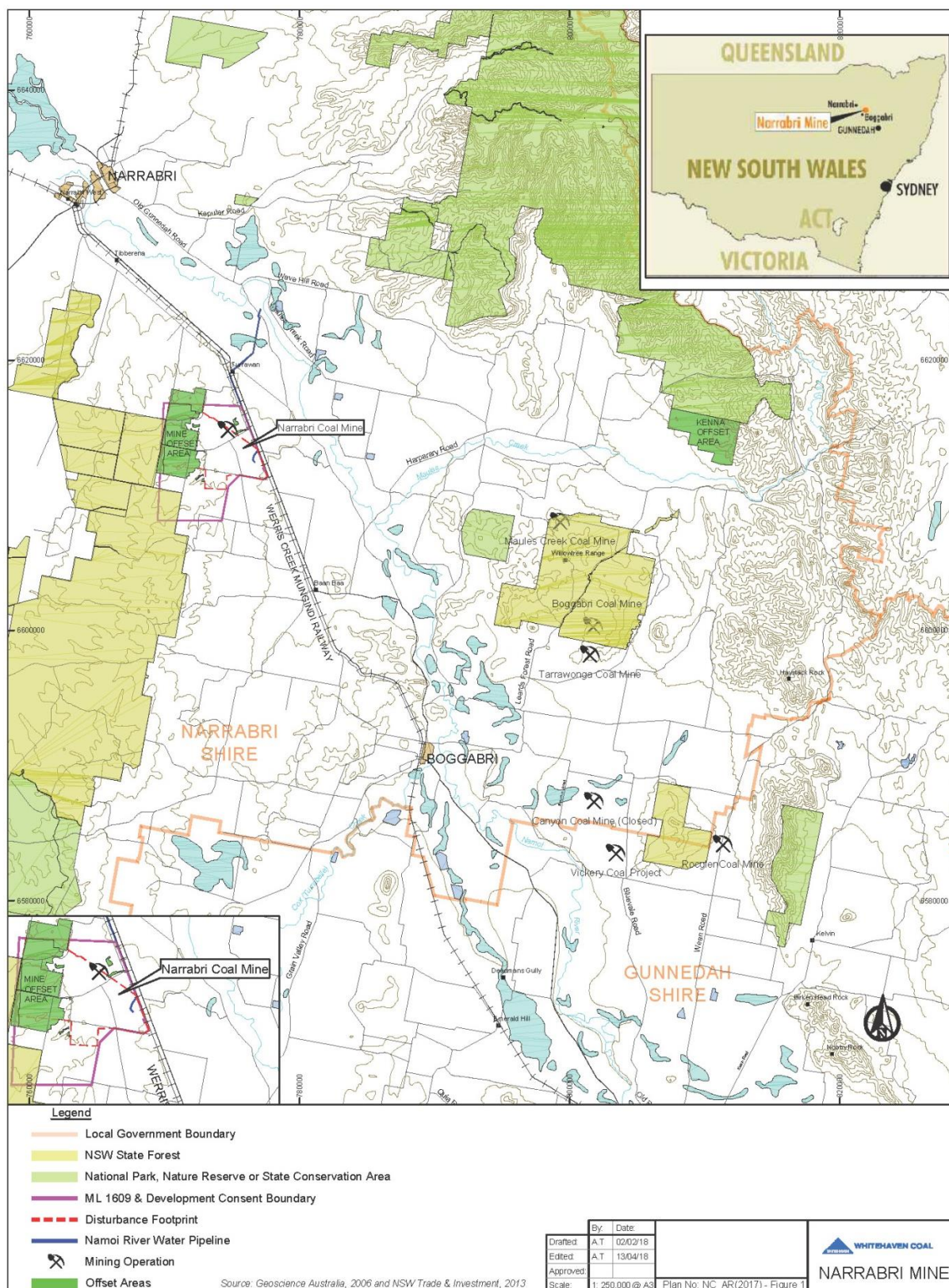


Figure 1: Project Locality Plan

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 Geoscience (DRG) now Resources Regulator within DP&E	EL 6243	18 February 2015	20 May 2019	Approval for exploration.
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
DRG	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: 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 90BL256386 90BL256396 - 90BL256397 90BL256402 90BL256410	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

Issuing / Responsible Authority	Type of Lease, Licence, Approval	Date of Issue	Expiry	Comments
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.
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.
	PA 08_0144 MOD6	13 January 2017	26 July 2031	Notice of modification under Section 75W of the EP&A Act to vary the annual reporting timeframe.
DRG	MOP 2017-2020	1 January 2017	30 November 2020	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. 43 exploration holes were completed on ML 1609 during the reporting period, and 24 exploration holes were completed on EL 6243 during the reporting period.

4.2 CONSTRUCTION

During the reporting period installation of the second ventilation shaft was completed. Development of the south-eastern longwall panels commenced during the reporting period and should be completed during the next reporting period.

4.3 MINING OPERATIONS

During the reporting period development extended into the main gate (MG) of longwall panels (LW) 109 and LW110 and the mains. The longwall unit has previously extracted LW101 to LW107. At the end of the reporting period the longwall unit was extracting LW108.

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)	0	0	0
ROM Coal*	11 Million Tonnes CY (PA 08_0144 Sch. 2, Cond.6) > 5 Million Tonnes produced (EPL 12789)	6.92	5.28	6.34
Reject Material	N/A (Million Tonnes)	0.20	0.31	0.32
Saleable Product**	> 5 Million Tonnes handled (EPL 12789)	6.66	4.94	6.10

* - 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.

** - Saleable Product is coal railed from site.

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 and seismic surveys will continue to be undertaken at the Narrabri Mine to further assess the coal reserves within the tenements. The focus of the ongoing exploration activities is planned to include:

- An additional 84 exploration boreholes to:
 - further investigate the JORC resource status within ML 1609;
 - further delineation of geological structures in ML1609;
 - 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

Development in the south-eastern longwall panels should be completed during the next reporting period.

4.5.3 Mine Operations

The mine production rate for the next reporting period will be similar to the current period. The mine is planning to produce 6.34 Mt of ROM coal and approximately 0.32 Mt of coarse reject material during the next reporting period.

4.5.4 Mining Fleet Upgrades

There are no planned upgrades to the mining fleet during the next reporting period.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

The 2017 Annual Review and subsequent regulatory correspondence identified the following actions, summarised in Table 8.

Table 8: Actions from the Previous Annual Review (2017)

Action required from Previous Annual Review	Requested By	Action Taken by the Operator	Where discussed in Annual Review
A topsoil stockpile was observed to have been buried by advancing REA material. A site materials balance and a review of REA material placement and management will need to be undertaken to identify any capping deficiencies for final land use.	Resources Regulator	The REA material placed over the topsoil stockpile has been removed.	Complete
Actions required to be addressed within a 12-month timeframe from the O'Kane's Consultation report (March 2017) have not been completed.		Sampling program has been undertaken to inform the additional studies recommended by the O'Kane's consultation report. These results are not yet available but the mine will consult with the Resources Regulator prior to finalising the capping strategy for the REA.	Section 11
Figure 1 should include the most recent aerial photograph.	DP&E (2 July 2018)	The mine confirmed that the most recent aerial photograph should be used in Figure 2 which DP&E agreed.	Completed Figure 2
Place a copy of the Annual Review on the website by 30 July 2018		The mine advised DP&E on 18 July 2018 that this was complete.	Complete

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.

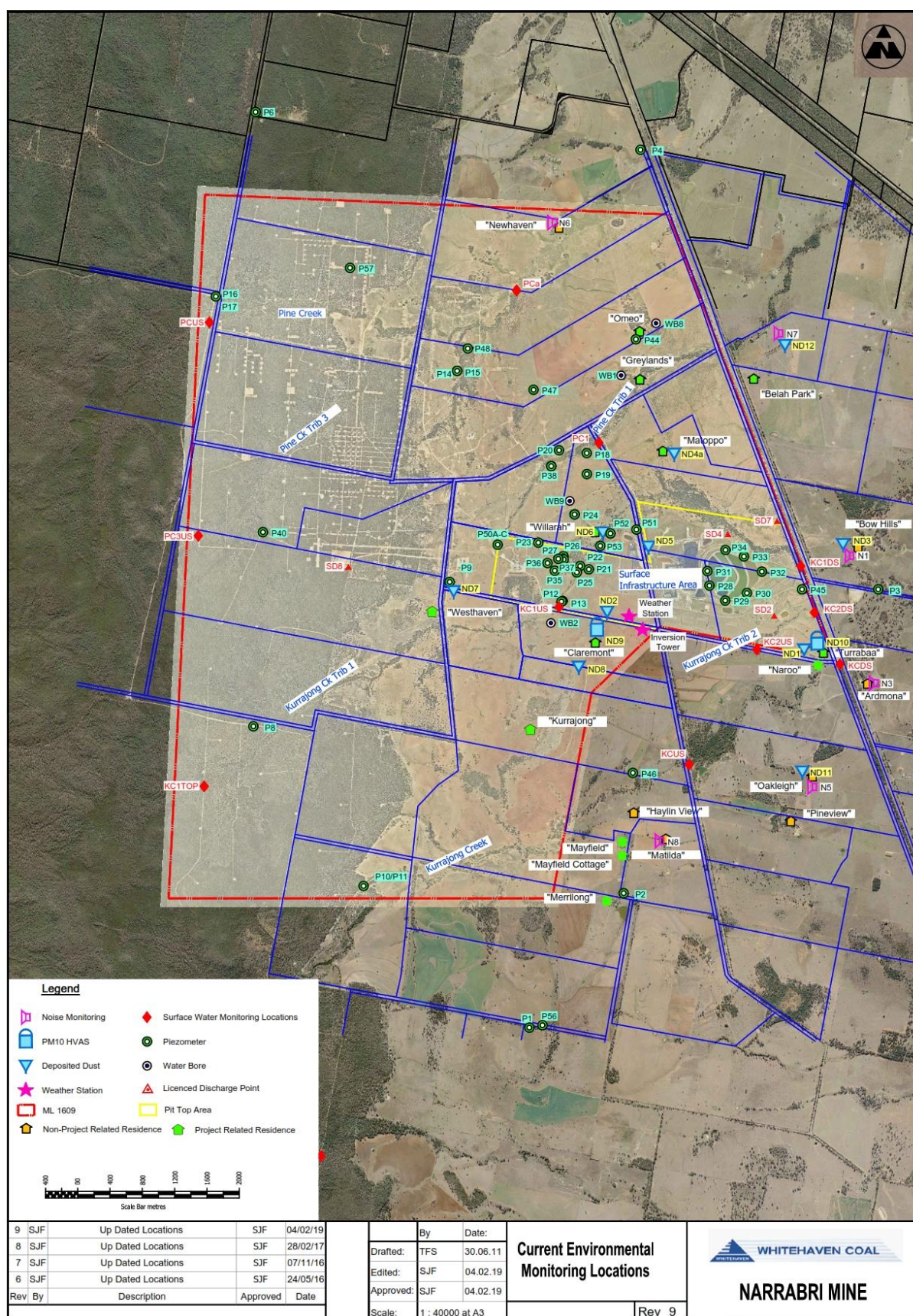


Figure 2: Current Environmental Monitoring Locations

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, 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:

- Implement the noise and inversion Trigger Action Response Plan (TARP) for surface coal processing operations;
- 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 three real-time monitoring units for management purposes;
- Quarterly attended monitoring at two locations as described in the EPL (N5 and N6); and
- Quarterly attended monitoring at two locations as described in the NMP (N3 and N8).

Quarterly monitoring is also undertaken at N1, however a private agreement is in place, and N7 is now mine owned and therefore the results are not included in this AR.

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 is outlined in Table 9 with additional details provided where results were recorded above the criteria at privately-owned residences where a private agreement is not in place.

Table 9: Noise Monitoring Summary

Site (see Figure 2)	Mod. 5 Max. EA Predicted Levels (dB(A))	Criteria (L _{Aeq} (15 minute), dB(A))	Quarter 1 (Mine Contribution, dB(A))	Quarter 2 (Mine Contribution, dB(A))	Quarter 3 (Mine Contribution, dB(A))	Quarter 4 (Mine Contribution, dB(A))	INP Low Frequency Penalty L _{Aeq} dB
N3	35	35	40	IA	32	35	NA
N5	31	35	<30	34	34	30	NA
N6	<30	35	<30	33	35	35	NA
N8	35	35	IA	IA	30	25	NA

*NA – Not Applicable as result affected by atmospheric conditions or no INP penalty applies.

IA = Inaudible.

On the 13th March 2018 there was a 5 dB exceedance of the L_{Aeq}(15minute) criterion and a 2 dB exceedance of the L_{A1,1minute} criterion at monitoring location N3. Dozer track noise and conveyor noise continuum were noted as the dominant noise sources from the mine. As no community complaints were received at the time of the exceedance and no alarms were triggered on nearby noise units operations were not altered at the time. As the exceedance was a one-off for the monitoring location the mine did not propose to undertake additional monitoring until the next round which did not identify any issues.

Sound Power Testing

Sound Power Level (SPL) testing was undertaken on key mobile plant and other fixed equipment during the reporting period with the results summarised in Table 10 below.

Table 10: SPL Testing Summary

Unit	Equipment Type	Parameter	Modelled SPL (dB)	Result dBA
MEU001	Goaf Drainage Unit	Average	102 ¹	101
MEU003	Goaf Drainage Unit	Average	102 ¹	100
MEU004	Goaf Drainage Unit	Average	102 ¹	100
MEU005	Goaf Drainage Unit	Average	102 ¹	103
MEU006	Goaf Drainage Unit	Average	102 ¹	101
DOZ004	Komatsu D375A Dozer 1 st gear reverse 2 nd gear reverse	Average	118	114
		Average		118
DOZ005	Komatsu D475A Dozer 1 st gear reverse 2 nd gear reverse	Average	118	114
		Average		118
DZ239	Caterpillar D11R Dozer 1 st gear reverse 2 nd gear reverse	Average	118	116
		Average		122

Unit	Equipment Type	Parameter	Modelled SPL (dB)	Result dBA
DZ246	Caterpillar D11T Dozer			
	1 st gear reverse	Average	118	116
	2 nd gear reverse	Average		120

1. Gas-drainage units are modelled at 102dB for >10 units however the mine currently only operates 5 units.

6.1.3 Proposed Improvement Measures

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

- Maintaining equipment exhausts and conducting noise testing of plant;
- Continue to investigate the purchase of additional gas drainage equipment, similar to what is being utilised currently; and
- Continue to investigate options for reducing SPL's on the stockpile dozer fleet and gas drainage equipment.

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 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 conveyers 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 11: Deposited Dust Monitoring Data Summary for the Reporting Period

Site (see Figure 2)	EPL ID No.	Property Name	PA 08_0144 Annual Average Criteria		Modification 5 EA Levels (g/m ² /month)	Annual Mean Total Insoluble Solids (g/m ² /month)	Annual Mean Ash (g/m ² /month)
			Max Increase (g/m ² /month)	Max Total (g/m ² /month)			
ND1	-	Turrabaa	2	4	2.2	4.8	3.4
ND2	-	Claremont	2	4	1.9	1.8	1.2
ND3	3	Bow Hills	2	4	2.0	2.5	1.5
ND4	-	Matoppo	2	4	2.3	2.8	2.1
ND5	-	Willarah	2	4	2.9	2.7	1.8
ND6	-	Willarah	2	4	2.9	6.1	1.2
ND7	-	Claremont	2	4	1.9	1.9	1.0
ND8	-	Claremont	2	4	1.9	3.7	2.9

Table 11 indicates that all the monitoring locations are below the annual average criteria with only ND1 and ND6 exceeding the annual average criteria. The ash content levels indicate that these two dust gauges are impacted by combustible material not indicative of dust sources associated with the mining operation. As most of the properties surrounding the site are now mine owned, only ND3 is included for both offsite impacts in the Modification 5 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 1.9 g/m²/month. The reporting period average for ND3 is 2.5 g/m²/month and the long-term average is 1.6 g/m²/month. The reporting period average is above the predicted level but below the annual average criteria. The ash content levels indicate that ND3 is impacted by combustible material not indicative of dust sources associated with the mining operation as the ash content average for the reporting period was 1.5 g/m²/month. 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. Trends indicate that 2018 was generally dustier than previously years which can be attributable to low rainfall and above average temperatures during the reporting period.

Monitoring conducted at the Narrabri Mine HVA's indicates that the PM₁₀ annual averages remain below the applicable criteria of 30 µg/m³ at both units, i.e. ND9 and ND10. The PM₁₀ 24 hour measurements were exceeded at both monitoring units on two occasions, refer below. The ND9 and ND10 HVA PM₁₀ monitoring results are illustrated in Figure 3 and Figure 4 below.

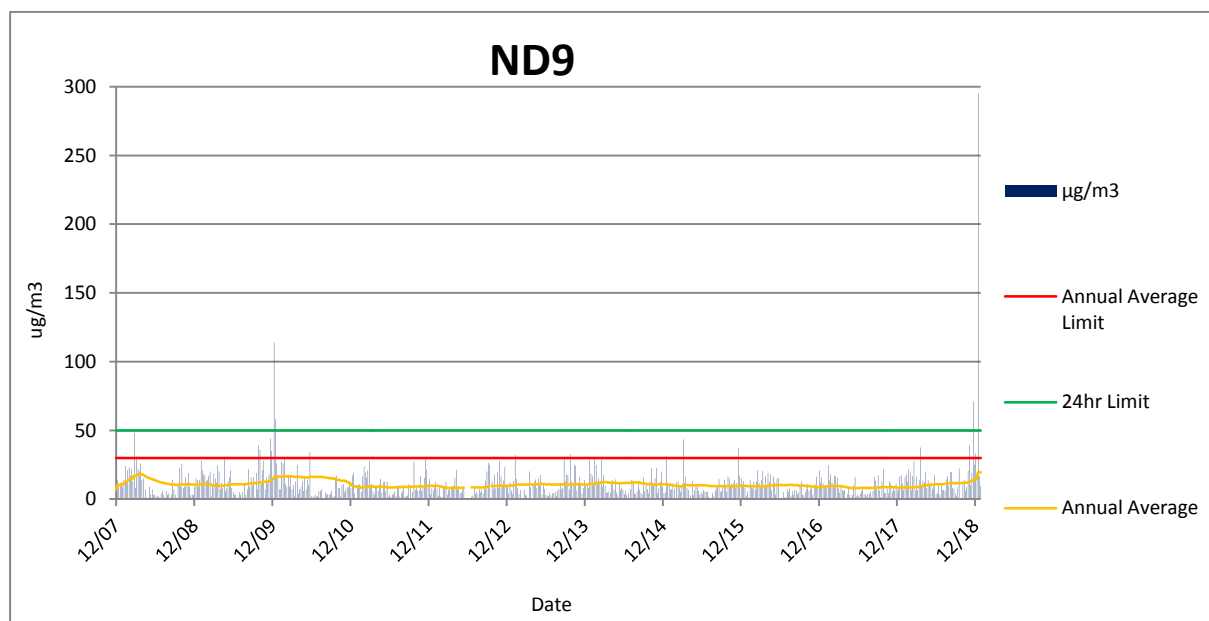


Figure 3: ND9 PM₁₀ Results

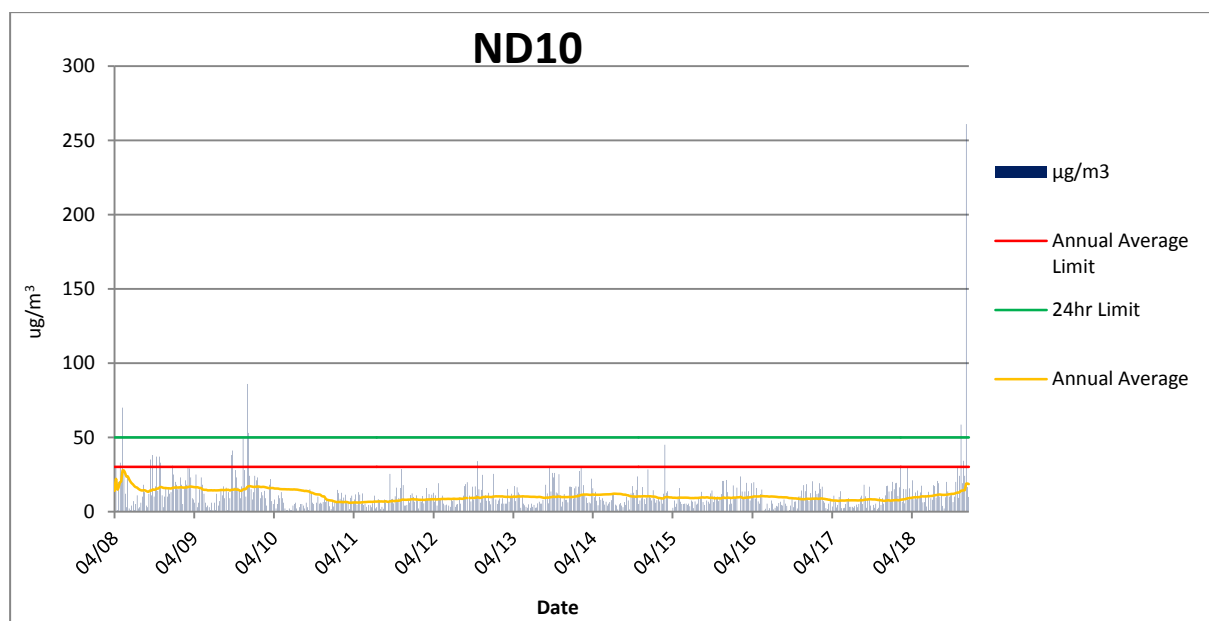


Figure 4: ND10 PM₁₀ Results

PM₁₀ levels are monitored on properties close to mining operations as outlined in the Narrabri Mine AQMP. During the reporting period two regional dust storm events in late November 2018 and mid-December 2018 both resulted in exceedances of the 24-hour criterion. The 24-hour criterion (i.e. 50 µg/m³) was exceeded on 21 November 2018 with ND9 and ND10 measuring PM₁₀ levels of 71.1 µg/m³ and 58.6 µg/m³, respectively. Monitoring for 15 December 2018 at ND9 and ND10 measured PM₁₀ levels of 295 µg/m³ and 261 µg/m³, respectively. These two exceedances associated with

regional dust storm events were the only two exceedances recorded during the reporting period. The exceedances were reported to the DP&E at the time as required by the mines' AQMP with no regulatory action taken during the reporting period.

The results for the PM₁₀ monitoring also confirm that the TSP criteria for the mine are 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 38.8 µg/m³ at ND9 and 37.0 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 12 summarises the monthly meteorological conditions recorded at the Narrabri Mine station for the reporting period.

Table 12: 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)	Pred. Direction	% of night time period*
Jan 2018	48.0	48.0	4	14.6	28.8	41.6	2.6	SE, NW	20
Feb 2018	56.0	104.0	7	15.2	26.1	40.4	3.0	SE	21
Mar 2018	18.2	122.2	3	11.2	24.9	38.5	3.2	SE	26
Apr 2018	9.4	131.6	2	9.0	21.5	33.2	2.8	SE	37
May 2018	0.2	131.8	0	0.3	14.6	26.9	2.3	SE	54
Jun 2018	8.6	140.4	3	0.1	11.4	22.6	2.4	SE	50
Jul 2018	8.4	148.8	2	-3.1	11.0	25.2	2.0	SE, W	68
Aug 2018	30.2	179.0	5	-1.7	11.6	24.7	2.0	SW, SE	63
Sep 2018	12.4	191.4	3	4.8	16.6	32.4	3.1	SE	38
Oct 2018	54.4	245.8	9	9.4	20.7	34.8	2.4	SE	21
Nov 2018	58.2	304.0	6	9.1	23.2	41.1	3.1	SE, W	22
Dec 2018	42.0	346.0	5	13.2	27.0	39.1	2.8	W, NW, SE	19

* - Inversion conditions as measured by the site Inversion Tower.

The total rainfall for the reporting period was 346 millimetres (mm). The total rainfall was well below the historical average of 658.5 mm. The maximum rainfall was recorded during November 2018 (58.2 mm), which is just below the historical average of 60.3 mm. The months of January 2018, March to September 2018 and December 2018 were relatively dry in comparison to historical averages.

During the reporting period the minimum temperature was -3.1°C recorded in July 2018 and the maximum temperature was 41.6°C in January 2018. The temperature records are slightly above the historical averages.

Measured winds were predominantly from the South East throughout most of the year. NW winds were also dominant in January and December 2018. Westerly winds were also dominant during July, November and December 2018. During August 2018 winds were also dominant from the SW. Comparison with the wind roses from the 2017 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; and
- Fugitive emissions associated with gas drainage and ventilation – Scope 1.

6.4.2 Environmental Performance

GHG emissions are reported through participation in the National Pollutant Inventory (NPI) and as part of the Whitehaven Group in the National Greenhouse and Energy Reporting Scheme (NGERS). The total GHG emissions attributed to the mine reported for the NGERS 2018 Financial Year (FY) were 435,937 t CO₂-e. The following sections detail the key GHG contributors for the 2018 NGERS reporting period.

Diesel Usage

Approximately 6,626 kL of Diesel (Stationary and Transport) was consumed equating to 17,957 t CO₂-e GHG Emissions. This is less than the predicted consumption outlined in the EA.

Fugitive Emissions

There were an estimated total of 346,068 t CO₂-e fugitive emissions generated from the mine in the 2018 FY. This is higher than the EA estimate and is related to additional drainage from the goaf circuit, which is attributable to higher gas concentrations in the coal than has been previously encountered.

Electricity Consumption

Approximately 86,531 MWh power equating to 71,821 t CO₂-e was consumed by the mine. This is less than the predicted consumption from the EA.

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, inspections and control;
- Flora and Fauna monitoring; and
- Fuel load assessment.

6.5.2 Environmental Performance and BOMP Implementation

6.5.2.1 Mine Site Environmental Performance

Weed Management

Weed monitoring and management was undertaken across the mine site during the reporting period. This included treating areas for African Boxthorn, Prickly Pear and Mother-of-Millions.

Feral Animals

Monitoring of the presence of feral animals was undertaken onsite. A targeted monitoring program for feral pigs was undertaken during the reporting period on the offset areas, refer below.

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 13 and Table 14.

Table 13: Biodiversity Management Plan 2018 Monitoring Results

Performance Measures	BMP Performance Criteria	2018 Results
LW101-LW106		
Woodland vegetation (Inland Grey Box EEC) composition and health	Clearing does not exceed the allowable limit of the Project Approval	Clearing was within the limit of the Project Approval.
	Less than 10% change in floristic composition (relative to natural variation found in control areas)	Compared to 2017, all of the eight impact plots for the Inland Grey Box woodland recorded greater than 10% increase in species composition. Based on a natural variation of 20%, two impact plots were outside the performance criteria range. However, this result is considered to be an artefact of seasonal variation between 2017 and 2018 rather than mine related impacts.

Performance Measures	BMP Performance Criteria	2018 Results
	Less than 10% increase in exotic species numbers and cover	All of the eight sites either remained the same or decreased in exotic species composition and meeting performance criteria. However, three out of eight sites increased greater than 10% in exotic species cover, resulting in an exceedance of performance criteria. Declared Priority Weeds <i>Lycium ferocissimum</i> (African Boxthorn) and <i>Opuntia stricta</i> (Prickly Pear) continue to be present at sites and require ongoing treatment as prescribed in the Rehabilitation Management Plan (RMP).
	No increase in feral animal presence	No increase in feral species presence.
Riparian vegetation composition and health	Clearing does not exceed the allowable limit of the Project Approval	Clearing was within the limit of the Project Approval.
	Less than 10% change in floristic composition (relative to natural variation found in control areas)	Changes in floristic composition at impact plots did not meet the performance criterion (variation in the control plot being -20.5% decrease in native species).
	Less than 10% increase in exotic species numbers and cover	Four of the six plots met the performance criterion for natural variation of -52% with all decreasing exotic species composition, with all four plots which were able to be accessed meeting the performance criterion for a reduction in exotic species cover. Compared to 2017, only the control plot 5 recorded greater than ten percent increase in exotic species cover. Prickly Pear continue to be present at several sites and require control as per the RMP. <i>Bryophyllum delagoense</i> (Mother of Millions) was recorded for the first time at plot 1 (Poplar Box- Belah Woodland).
	No increase in feral animal presence	No increase in feral species presence.
	Less than 20% increase in length of eroding creek	Refer to Land Management Monitoring Report for 2018
Terrestrial fauna habitat for threatened species	Fauna populations do not experience adverse impacts	In 2018, three of the six woodland monitoring sites monitored in spring recorded a greater than 10 percent decrease in bird species richness, with only one recording a similar decrease for bird abundance.

Performance Measures	BMP Performance Criteria	2018 Results
	Fauna records decrease by greater than 10% (relative to natural variation found in control areas)	For the creekline sites, the performance criteria for impact sites was exceeded for species richness at all but one site in the winter monitoring season and only one site in the autumn monitoring season. Spring monitoring results all fell within the threshold for species richness and abundance, whereas only one site exceeded this limit during the autumn survey and all sites exceeded the threshold during winter. The exceedance is considered to be an artefact of the seasonal variation between 2017 and 2018 and the similarity of the bird community between the two habitat types. For microbat species richness, the criterion was not met at site MC2, MC5 and MW6 for both definite and total calls.
Aquatic macro-invertebrate and macrophyte assemblages	No decline in aquatic habitat quality relatively to natural variation in control areas	Monitoring of ephemeral creeks discontinued as per the revised BMP (ELA 2015a). For the monitoring targeting subsidence ponds above LW101 and LW104, as per Narrabri Mine Subsidence Pond Management Plan (ELA 2018), refer below for results.

LW107-LW110

Woodland and riparian vegetation health and habitat value	Areas of NDVI change greater than 1 standard deviation from the mean change and greater than 0.1 ha in area. Canopy dieback is not substantially greater than that observed during baseline traverses and considered beyond natural seasonal dieback and natural variation due to weather. Data does not indicate declining trend in vegetation and habitat conditions. Less than 10% increase in weed cover in impact quadrats in comparison to control quadrats. Clearing does not exceed the estimated area of clearing assessed by the Stage 2 EA and as updated in Modification 5 (Resource Strategies, 2015) for infrastructure above LW107 to LW110.	No identifiable change to overall drainage pattern. Decline in canopy health is evident through increases in discolouration, epicormic growth and branch dieback. Although this was often in conformity with the control zones, and therefore is likely a stress indicator derived from the dry conditions seen in 2018. No increase in weed cover. Clearing is within approved clearing limit.
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Performance Measures	BMP Performance Criteria	2018 Results
Observance of trapped Delicate Mouse or Pale-headed Snake within surface cracks	Incidence of Delicate Mouse and/or Pale-headed snake becoming trapped in surface cracks.	There were no incidences of Delicate Mouse or Pale-headed Snake becoming trapped in surface cracks during the 2018 monitoring period.

The exceedances recorded for the flora and fauna monitoring for LW101 to LW106 for the 2018 period are likely to be an artefact of the difference in seasonal conditions leading up to the surveys undertaken in 2017 and 2018 and the application of the Biodiversity Management Plan Performance Criteria rather than any impacts associated with mining operations.

In 2018, the site experienced extended dry conditions prior to monitoring. These conditions are likely to have suppressed plant growth leading to a decline in species richness and abundance. Similarly, these conditions likely influenced bird behaviour and community composition and abundance. While both plant and bird numbers and richness are likely to have been higher in 2016 and 2017 in response to the wet conditions, the opposite can be expected for the drier conditions experienced during the 2018 monitoring. Comparing a 'drier' year to a 'wetter' year using the natural variation calculated from just one year is likely to skew results for that particular comparison.

Table 14: Land Management Plan 2018 Monitoring Results

Performance Measures	Performance Criteria	Comment
LW101-LW106		
<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.	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.	This was assessed in 2017 and is scheduled for re-assessment in 2020.
Creeklines	No identifiable change in overall drainage pattern.	This was assessed in 2017 and is scheduled for re-assessment in 2020.
<i>Soil moisture and nutrient distribution (EM mapping)</i>		

Performance Measures	Performance Criteria	Comment
Soil moisture and nutrient distribution (EM mapping)	Identified areas of EM mapping change (greater than 1 standard deviation from the mean change) investigated in the field to determine the source of the change.	This was assessed in 2016 and is scheduled for re-assessment in 2021.
Multi-spectral image analysis		
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.	Most areas of NDVI change attributed to land management, surface disturbance works and re-establishment of groundcover. A reduction of groundcover and possible canopy dieback were recorded, however these are attributed to dry climatic conditions rather than mining activities.
Pasture		
Pasture biomass	Less than 20% reduction in pasture biomass in impact zones in comparison to control zones	While two individual zones (the subsidence zone above LW102 and the pillar zone above LW101/102) showed a reduction of more than 20% in pasture biomass, the majority of zones met the performance criteria and hence NCOPL is compliant with this performance measure.
Weed species	Weed species identified and managed according to the weed management measures provided in the Rehabilitation Management Plan	Weed cover decreased at most sites in 2018, and the control sites were not significantly different to the impact sites. The main differences were found within the impact sites across multiple longwalls. No clear trends were observed between transition, maximum subsidence and pillar zones.
Weed cover	Less than 10% increase in weed cover in impact zones in comparison to the control zone	The performance criterion was not met in the transition zone above LW102 and LW106, the maximum subsidence zone above LW102 and pillar zones above LW104/105. However, these zones still recorded a decrease in cover of at least 65%.
Soil nutrient status		
pH	pH remains within +/- 0.5 pH unit of baseline pH. If soil amelioration is undertaken, pH is to remain within recommended pH range for pasture (5.2-8.0).	This was assessed in 2017 and is scheduled for re-assessment in 2020.
EC	Less than 20% increase in EC in comparison to baseline values.	This was assessed in 2017 and is scheduled for re-assessment in 2020.

Performance Measures	Performance Criteria	Comment
Organic matter	Less than 20% reduction in organic matter in comparison to baseline values.	This was assessed in 2017 and is scheduled for re-assessment in 2020.
Nitrogen	Less than 20% reduction in total nitrogen in comparison to baseline values.	This was assessed in 2017 and is scheduled for re-assessment in 2020.
Phosphorous	Less than 20% reduction in phosphorous in comparison to baseline values.	This was assessed in 2017 and is scheduled for re-assessment in 2020.

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)	Erosion and deposition has occurred at most survey locations; however, this is characteristic of creeks such as Pine Creek and Kurrajong Creek, particularly in a cleared landscape. Decreased cross-sectional area was recorded at all impact sites, indicating deposition has occurred.
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LW107-LW110

Surface cracking

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 was observed above LW108 during spring monitoring and will need to be ameliorated if they do not self-close.
	Surface cracking is remediated to prevent erosion and slope instability issues within 6 months of mining of each longwall.	Surface cracking was observed above LW107 during spring monitoring and will need to be ameliorated if they do not self-close.

Topographic form (Lidar)

Landscape morphology	Subsidence across the landscape does not exceed subsidence predictions for LW107 to LW110.	Subsidence across the landscape has not exceeded subsidence predictions for LW107-LW110.
Creek lines	No identifiable change to overall drainage pattern.	No identifiable change to overall drainage pattern.
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.	NDVI change attributed to development of surface infrastructure.

Performance Measures	Performance Criteria	Comment
	Site specific management report prepared and recommendations implemented where necessary.	2018 ELA Monitoring Report

Subsidence Pond Monitoring

The results of annual monitoring undertaken during the reporting period, as required by the Subsidence Pond Management Plan (SPMP) are summarised below:

- Water quality in both subsidence ponds has been suitable to support biodiversity in previous years. Prior to both ponds drying up, EC initially increased due to concentration of ions. In 2018, the groundcover composition was dominated by pasture species and forbs. Waterbird diversity has increased over time, with fluctuations occurring as water levels decrease, however no waterbirds were recorded in the 2018 winter surveys when the ponds had dried up.
- Remote sensing analysis of the riparian zone downstream of LW101, undertaken for the Subsidence Pond Management Plan (ELA 2017) concluded that there have been no areas of decline in riparian condition because of the subsidence pond above LW101 withholding water. Data collected from the two riparian monitoring plots established in this round of monitoring aims to support that finding through ongoing monitoring in subsequent years.
- The 2018 survey period has provided a greater understanding of ecological conditions during extended dry periods. Ongoing monitoring will provide an understanding of ecological changes to the ponds as they transition into functioning ephemeral wetlands.

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 *Biodiversity Conservation Act*

2016 (BC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were also encountered.

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

- Speckled Warbler (*Chthonicola sagittate*) – listed as Vulnerable under the BC Act.

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

- Coolabah Bertya (*Bertya opposens*) – listed as vulnerable under the BC Act and EPBC Act; and
- *Tylophora linearis* – listed as Vulnerable under the BC Act and listed as Endangered under the EPBC Act.

6.5.2.2 BOS Environmental Performance

The Biodiversity Offset Strategy (BOS) for the mine commits to managing designated offset areas to achieve a 'like for like or better' and 'maintained or improved' biodiversity outcomes on the 1,243ha Kenna Biodiversity Offset Area (BOA) located offsite adjacent to the southern boundary of the Kaputar National Park and the 422 ha Onsite (Rosevale, Greylands, Omeo and Kurrajong Park) BOA located within and adjacent to the west of the mining lease and to the east of Jacks Creek State Forest apart of the large "Pilliga Forest" remnant.

Offset Security Management

During the reporting period, the mine undertook detailed cadastral survey definition and vegetation assessment as part of preparation of Conservation Agreements with the NSW Biodiversity Conservation Trust (BCT). Whitehaven worked closely with the BCT during 2018 to progress Conservation Agreements towards in perpetuity securement of the BOAs. Whitehaven has consulted with DP&E and DoEE as required during the reporting period to keep key regulators abreast of securement progress. Following registration of Conservation Agreements, Whitehaven will prioritise negotiations of those BOAs that NPWS has previously shown interest in being transferred to National Park Estate.

Infrastructure Management

During the reporting period, 11.9km of redundant internal fences were deconstructed from the revegetation areas on the Kenna BOA. Part of the former fencing material and redundant waste historically deposited onsite at the Kenna BOA was removed and recycled at the Narrabri Waste Management Facility with the remainder temporarily stockpiled to be correctly disposed offsite during the next reporting period. Also during the reporting period, 4.6km of new fencing (fauna friendly) was constructed replacing older sections of the Kenna BOA boundary. The condition of the BOA fences, gates and signage were maintained to continue restricting unauthorised access and prevent inadvertent livestock grazing. Hazardous material assessments were completed during the reporting period for redundant and derelict assets/infrastructure (i.e. sheds and cottages) associated with the former agricultural use as part of planning for their demolition and removal in the next reporting period.

Seed Management

Routine seed assessments completed for the Onsite BOA were impacted by the severe drought conditions that were experienced during 2018. The routine seed assessments aim to identify on a seasonal basis the life cycle stage and development of native plants to identify what, where, when and

how to target appropriate resources to collect seed for future revegetation programs. Because of the drought conditions, additional seed collection opportunities within the Onsite BOA were limited.

As part of the Whitehaven group wide revegetation planning; previous onsite collected seed was supplemented with commercially sourced local and regional provident seed by reputable seed collectors. A local revegetation provider was engaged to propagate the seed to produce Box Gum and non-EEC/CEEC Woodland overstorey species seedlings required for the FY18 (completed) and currently being grown for the FY19 revegetation program for the Kenna BOA.

Revegetation Management

During the reporting period, revegetation ground preparation utilising the following equipment and methods including dozer ripping (three tynes wide to a depth >0.3m every 5m along the contour and lightly scarifying the soil surface in lower condition areas) and tractor mounding (rows every 10m to a height 0.2m) to relieve compaction, improve permeability and infiltration to increase sub-surface soil moisture as well improve soil seed bed to maximise soil-seed contact during sowing was completed over 300ha of the Kenna BOA in April 2018 in preparation for next and future years revegetation programs. Whitehaven coordinated two revegetation programs in 2018 with the understorey revegetation (direct seeding) over 37ha sown in May 2018 including 440kg of native grass seed (18 species), 37kg of native forb seed (9 species) and 848kg of bulking agent (lime). Overstorey revegetation program covered 102ha in August 2018 planted with 11,540 hiko seedlings of *Eucalyptus albens*, *Eucalyptus blakelyi*, *Eucalyptus melliodora*, *Eucalyptus crebra*, *Eucalyptus pilligaensis*, *Eucalyptus populanea* and *Angophora floribunda*. Despite the prevailing drought conditions throughout 2018, routine tree watering and maintenance activities post planting have been successful to ensure that over an 80% survival rate had been achieved by the end of the reporting period and ensuring that a better than minimum survival (50 trees per hectare) is achieved commensurate with the target Box Gum Woodland vegetation structure of the Kenna BOA. Previous ecological due diligence identified that there were 36ha of natural regeneration revegetation not requiring additional active revegetation at Kenna BOA.

Heritage Management

During the reporting period, historical heritage assessments were completed for redundant and derelict assets/infrastructure (i.e. sheds and cottages) associated with the former agricultural use as part of planning for their demolition and removal in the next reporting period. There are five known Aboriginal cultural heritage sites within and adjacent to the Kenna BOA with each site maintained with identification/demarcating fencing around the heritage site perimeter and signage to mitigate access and disturbance.

Habitat Management

During the reporting period, two rock debris habitat structures were constructed for habitat augmentation in accordance with the BOS.

Weed Management

Whitehaven routine formal weed monitoring/inspections were undertaken across Kenna and Onsite BOAs in February, May, September and November 2018. The priority weeds for control were noted as general broadleaf weeds (Biosecurity Act 2015 priority and general biosecurity duty species) as well as legacy noxious weeds inherited from previous owners management regimes such as African Lovegrass, Mother of Millions, Green Cestrum, African Box Thorn and Common Prickly Pear. The weed monitoring/inspections ensure that timely and prioritised weed control is undertaken on a

seasonal basis with the spatial information directly given to spraying contractors to identify what, where, when and how to target appropriate resources across the Kenna and Onsite BOAs for weed control.

During the reporting period, Whitehaven implemented a comprehensive weed control program with 979.5ha and 23.5ha treated across the Kenna and Onsite BOAs respectively, targeting Broadleaf, Green Cestrum, African Box Thorn and African Lovegrass infestations. Only appropriately qualified and experienced weed contractors (AQF3 accreditation or higher for use of herbicide) were engaged to undertake weed control works for Whitehaven.

Feral Animals Management

Whitehaven coordinated routine formal feral animal monitoring across the Kenna and Onsite BOAs in February, May, September and November 2018. The adoption of a “monitor, measure and manage” approach to feral animal management will allow Whitehaven to implement adaptive management in response to changes being measured through monitoring in feral animal abundance specific to the different geographical regions of the BOAs. Feral animal monitoring utilises the relevant methodologies for specific feral animals generally in accordance with the NSW DPI *Monitoring Techniques for Vertebrate Pests* so that a range of methods can be used such as transects/spotlighting and cameras traps where practicable and relevant to specific offset areas/properties. Monitoring demonstrated that certain animals like Feral Pigs and Eastern Grey Kangaroos can be seasonally moderate to high in abundance with all other feral animal species recorded as scarce to low levels. The feral animal monitoring ensures that timely and prioritised feral animal control is undertaken on a seasonal basis identifying what, where, when and how to target appropriate resources across the BOAs for feral animal management.

During the reporting period, Whitehaven implemented a comprehensive feral animal control program across the Kenna and Onsite BOAs with fox baiting and pig trapping undertaken in March (8 Foxes baited from 42 baits presented and 10 Feral Pigs trapped), June (5 Foxes baited from 56 baits presented and 16 Feral Pigs trapped), October (5 Foxes from 56 baits presented and no Feral Pigs trapped) and December 2018 (4 Foxes baited from 56 baits presented, 9 Hares removed and 6 Feral Pigs trapped). Feral Goat harvesting during the reporting period resulted in 204 captured with the Feral Goats on-sold to an abattoir. Only appropriately qualified and experienced feral animal contractors (appropriate feral animal management qualifications, NSW gun licence and pesticide accreditation where relevant) were engaged to undertake feral animal control works for WHC.

Soil & Erosion Management

During the reporting period, no specific treatment for soil erosion mitigation works were undertaken.

Grazing Management

Kenna BOA was destocked in September 2016 and during the reporting period grazing was continued to be excluded from all BOAs.

Bushfire Management

In accordance with the BOS, annual fuel load monitoring was undertaken in December 2018 as part of planning and assessment for an ecological burn of the Kenna Offset revegetation areas in Autumn 2019. Whitehaven also completed a 37ha ecological burn of the Kenna BOA in April 2018. Other fire management implemented during the reporting period included the maintenance fire break tracks (27.6km) to a zero fuel barrier standard. Whitehaven maintains regular communications throughout

the reporting period with both the Liverpool Range and Namoi-Gwydir Zone RFS teams around planning of BOA site ecological burn programs as well as providing Whitehaven emergency contacts. Whitehaven maintains a specialist firefighting contractor for an on-call engagement during the fire season to respond in the event of a bushfire on BOAs and non-mining lands.

Monitoring Program

Kenna

During the reporting period, the ecological monitoring program of the Kenna BOA included winter bird surveys that were undertaken in July 2018; annual spring flora monitoring of 24 plots and fauna monitoring of 13 sites both undertaken during November 2018. During the winter bird surveys, three threatened species were recorded (Brown Treecreeper, Grey-crowned Babbler and Speckled Warbler). The prevailing dry conditions for much of 2018 resulted in the native plant species richness to decrease from 20 sites last year to 19 out of the 22 sites meeting or exceeding the performance criteria (75% of native species richness benchmark for relevant biometric vegetation communities i.e. between 23 and 30 native species). 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. Native overstorey cover decreased from 13 sites last year to 8 out of the 22 sites meeting or exceeding the performance criteria (75% of overstorey cover benchmark for relevant biometric vegetation communities i.e. between 0% and 40% cover). Native midstorey cover decreased from 17 sites last year to 16 out of the 22 sites meeting or exceeding the performance criteria (75% of midstorey cover benchmark for relevant biometric vegetation communities i.e. between 0% and 25% cover). Native ground cover grasses had no change from the previous year with 17 out of the 22 sites meeting or exceeding the performance criteria (75% of grass groundcover benchmark for relevant biometric vegetation communities i.e. between 5% and 40% cover). Diurnal bird survey results for total species richness was 104 but ranged between 21 and 42 at the 13 sites monitored in 2018; which was an increase from 2017 total diurnal bird species richness 94 and sites ranged between 11 and 34. Analysis of anabat data for microbat total species richness was 12 but ranged between 6 and 10 at the 10 sites monitored in 2018; which was consistent with 2017 microbat total species richness of 13 and site ranged between 4 and 12. A complete fauna species list is included as **Appendix C** as required by the BOS and the associated management plans.

Onsite

The 2018 monitoring surveys (Biodiversity Offset – Spring 2018 Monitoring Report, ELA 2019) within the Mine BOA identified 183 species of which 173 (95%) were native. One threatened species of plant, *Tylophora linearis*, was identified during the surveys. During 2018, there was a slight increase in native flora species richness, despite declines recorded in 2017. The three months preceding flora surveys had well below average rainfall, which may have impacted flora species diversity as some native species are better adapted to droughts. There was a substantial drop in exotic flora species richness from 2016 to 2017, and exotic species richness in 2018 was consistent with previous years. Targeted surveys for *Bertya opposens* and *Pomaderris queenslandica* revealed populations in generally good health. 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 2018 monitoring surveys 82 animal species, including 62 birds, 16 mammals and six reptile species were recorded within the Mine BOA monitoring sites. This included two introduced mammals (Fox and feral cat). This report found diurnal birds and microbat diversity has declined across all Offset Management Zones (OMZ), with the decline likely due to extended dry conditions experienced in the

region. For the other fauna groups, data is either insufficient or infrequent to assess any patterns. A complete fauna species list is included as **Appendix C** as required by the BOS and the associated management plans.

Seven species listed under the BC Act 2016 were observed or positively identified via ultrasonic recording analysis during surveys, including, Grey-crowned Babbler, Speckled Warbler, Eastern Bentwing-bat, Corben's Long-eared Bat, Yellow-bellied Sheath-tail-bat, Inland Forest Bat and Eastern Cave Bat.

Recommendations from the annual BOA monitoring (Biodiversity Offset – Spring 2018 Monitoring Report, ELA 2019) undertaken in accordance with the BOS include:

- In order to establish greater consistency in subsequent surveys, ELA recommend that the flora base plots are shortened to 50 m. This will allow plots to avoid roads and remain within the vegetation community.
- ELA also recommend ensuring markers (e.g. star-pickets) are in place at the end of each 50 m transect to ensure that the transect follows the same line each year. This recommendation has been adopted at the Kenna BOA in 2018 and would allow for comparisons to be made between sites.
- For targeted flora surveys in future years, it may be preferable to set up a precisely defined area (e.g. 10 x 40 m plot) with each corner permanently staked, in which all targeted plants are counted. This would ensure that plants are counted within the exact same area and allow for the meaningful comparison of data from subsequent surveys.

6.5.3 Proposed Improvement Measures

- Continual weed control works onsite and in the offset areas for Green Cestrum, Coolatai Grass, African Boxthorn, prickly pear 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 control program 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) 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 a 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 was provided to the RAPs for additional comments following review by OEH. The mine intends to finalise the ACHMP during the next reporting period.

Previously Unidentified Sites

No new sites were recorded during the reporting period.

6.6.3 Proposed Improvement Measures

During the next reporting period the mine intends to finalise the revisions to the site 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

The portion of Greylands Road that traverses the mining area has been purchased by the mine and is no longer accessible to the public. 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). The RMS has advised the mine that the ongoing maintenance of the intersection is the responsibility of the RMS.

6.8.3 Proposed Improvement Measures

During the next reporting period the mine will seek approval from NSC to utilise a portion of Scratch Road to construct mine related infrastructure. No proposed improvement measures are required as the mine will continue to liaise with RMS and NSC as required.

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 2,293 tonnes (t) of general waste was removed during the reporting period of which approximately 87% was transported to the licenced contractors facility for further segregation. Approximately 45 tonnes of cardboard/paper and 367 tonnes of steel were recycled during the reporting period. The volumes identified above are slightly higher when compared to the previous reporting period indicating the volume of wastes generated at the mine during full production. Approximately 54,900 L of used oils were collected and recycled during the reporting period by an authorised contractor, which is higher than 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 39,000 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 VISUAL & LIGHTING

6.10.1 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.

6.10.2 Environmental Performance

No community complaints were received during the reporting period relating to the visual amenity or lighting associated with the mine.

6.10.3 Proposed Improvement Measures

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

6.11 BUSHFIRE

6.11.1 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:

- implementation of the Bushfire Prevention Standard and Bushfire Emergency Response Procedure;
- participation by Whitehaven Coal 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.

6.11.2 Environmental Performance

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

6.11.3 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.

6.12 MINE SUBSIDENCE

6.12.1 Environmental Management

During the reporting period mining in LW107 was completed during July 2018 and mining in LW108 had retreated 939m out of 3,604m. The extraction height averaged 4.3 m and the depth of cover ranged between 250m and 290m.

6.12.1.1 Subsidence Monitoring

Subsidence monitoring was conducted in accordance with the approved Extraction Plan.

6.12.2 Environmental Performance

Electricity Transmission Lines

The 11kV power line that traverses LW101 to LW105 has been decommissioned 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 LW108.

Public Roads

The one public road within the mining area, known as Greylands Road, was purchased by the mine during the previous reporting period and is no longer accessible to the public. Repairs required for traffic-ability for mine personnel were undertaken as required.

Land Surface

No ponding occurred in LW108 during the reporting period due to the hot dry weather experienced at the site. No ploughing or seeding of the subsidence area was undertaken during the reporting period as the soil conditions were unfavourable, refer to Section 6.3.1.1.

Buildings and Other Structures

No buildings or sheds were undermined during the reporting period.

Water Storage Dams and Contour Banks

No known farm dams or contour banks were undermined during the reporting period.

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 and the Personal Emergency Device (PED) cable 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.

6.12.2.1 Comparison against Predictions

Table 15 outlines the predicted subsidence and the measured subsidence parameters at the end of the reporting period for the most recently mined panel being LW108. For more details on the subsidence monitoring lines refer to the Whitehaven Coal website.

Table 15: Subsidence Parameters – Predicted and Measured

Monitoring Line	Type	Maximum Total Subsidence	Maximum Total Tilt (mm/m)	Maximum Total Tensile Strain (mm/m)	Maximum Total Compressive Strain (mm/m)	Angle of Draw (°, Degrees)
LW108 North	Observed	2.515	36.3	16.2	38.9	27.6
	Predicted	2.75	38	15	20	32.1

Based on Table 15, subsidence prediction exceedances did not occur during the reporting period. The results are summarised below:

- The maximum subsidence measurements for the LW108 North monitoring line was within the predicted range.
- The maximum tilt measurements were within the predicted range for LW108 North.
- The maximum tensile strain measurements were above the maximum predicted however 98% of the results were within the predicted range for LW108 North.
- The maximum compressive strain measurements were above the maximum predicted however 97% of the results were within the predicted range for LW108 North.

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.

6.12.2.2 Incidents

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

6.12.3 Proposed Improvement Measures

Seeding of longwall areas will be undertaken when soil moisture conditions improve.

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 16 summarises the water taken by the mine during the 2018 water year, i.e. the 2018 financial year.

Table 16: 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	67	0	67	67
WAL 20131	Upper and Lower Namoi Groundwater Sources	Upper Namoi Zone 5 Namoi Valley (Gin's Leap to Narrabri) Groundwater Source	300	0	223	223
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	571	571
WAL 2671	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	60	0	52.5	52.5
WAL 6762	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	20	0	20	20
WAL 2728	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	12.5	0	8.3	8.3
WAL 20152	Upper Namoi and Lower Namoi Regulated River Water Sources	Lower Namoi Regulated River Water Source	750	0	0	0

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 three 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 and SD4, 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. The WCP was upgraded during the reporting period to increase the capacity as well as the ability to process higher EC water.

Wet Weather Discharge Monitoring

No wet weather discharges occurred during the reporting period.

Subsidence Surface Water Impacts

Refer to Sections 6.5.2 and 6.12.2.

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.

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 17.

Table 17: 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, P28, P29, P30, P31, P32, P33, P34, P39, P43, P47, P51, P52, P53, WB1, WB2, WB3a, WB3b, WB4, WB5a, WB5b, WB6a, WB6b, WB7 and WB8	Water level EC pH TDS Metals Anions and Cations	Monthly (water level, pH and EC) 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, P42, P44, P45, P46, P54, P55, P56 and P57	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

Annual Hydrogeological Review

An annual hydrogeological review was undertaken by Groundwater Exploration Services in February 2019 for the period 1 January 2018 to 31 December 2018. The results of the review are summarised below. Parameters recorded as part of the scheduled groundwater monitoring for this reporting period are provided in Appendix E as required by the WMP.

Groundwater Inflows

To date, since monitoring records have been maintained, the total annual groundwater inflow to the workings has not exceeded the Access Licence Category (Mining) License (90BL254679) of 818/year. The annual inflow reported from Narrabri Mine during 2018 is **319ML**.

Groundwater Levels

Water levels monitored during the 2018 reporting period did not observe any notable rise or fall in groundwater levels associated with strata subsidence effects from longwall mining activities and associated subsidence which is outside that predicted.

Significant depressurisation of the Hoskissons Coal Seam and the Arkarula Formation has been observed during and after extraction of longwall panels LW101 – LW108. This notable depressurisation was observed in numerous groundwater monitoring records, particularly close to mine workings as indicated in P40. During late 2018, P40 instrumentation failed due to mining related stresses. However, this is not an unusual phenomenon in underground mining environments given the close proximity to mining activities and the pressure reductions observed are consistent with predictions that have been made.

The 2016 review indicated that there has been groundwater pressure decline which is close to predicted drawdown in P9. The Trigger Action Response Plan within the WMP indicates that “Drawdown greater than 15% above predicted trend in WVPs, monitoring bores, and private landholder bores (not pumping affected)” require further investigative action. However, this groundwater level decline had stabilised during 2017 and water levels fell by a further 20cm in 2018.

Groundwater Quality

No adverse changes to groundwater quality within the WMP area have been observed or reported, with no distinctive increase in salinity, no distinctive lowering of pH and no reduction in water quality with regards to dissolved metals or nutrients have been reported during the reporting period.

Compensatory Water Supply

No compensatory water has been required as no privately-owned water supplies have been affected.

7.3.3 Proposed Improvement Measures

The groundwater monitoring program and management measures described above will continue to be implemented during the next reporting period.

7.4 SITE WATER BALANCE

Table 18 presents an estimate of the volume of stored water at the beginning and end of the reporting period.

Table 18: 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)	6,551	2,265	104,535
Dirty Water (in Sediment Basins)	27,329	31,898	75,602
Evaporation Ponds*	452,718	514,748	217,952
* = Additional 40ML of storage in containment bund in rail loop.			
Note: 1m ³ = 1,000L			

The revised Surface Water Assessment (Narrabri Mine Modification 5 Surface Water Assessment, WRM 2015) predicts the mine would require a raw water supply of 93ML for year 2018 however the mine imported 475ML for the year. The Surface Water Assessment also predicted that 0ML would be released offsite during 2018 and 0ML was released. The Groundwater Assessment (Narrabri Mine

Modification Groundwater Assessment, Heritage Computing 2015) predicts that during 2018 855ML would be dewatered from the mine however only 594ML was dewatered from the mine. This indicates that the mine is still in water deficit. The Groundwater Assessment also predicted that the mine will be in water surplus, i.e. is producing more water than it requires for operation, around 2018. Other Surface Water Assessment predictions against actual volumes is summarised below:

- 84ML of reclaim water predicted to be used in the stockpile sprays, 126ML was used for the reporting period;
- 280ML of reclaim water predicted to be required for the CHPP, 251ML was required for the reporting period; and
- 306ML of filtered water predicted to be used underground, 485ML of filtered water was required for the reporting period.

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 over LW101 to LW106 has occurred naturally. Approximately 250 kg of seed was spread on approximately 9.7 ha of rehabilitated land on LW102 and LW103 during the reporting period. Rehabilitation activities undertaken during the reporting period include: filling in sumps associated with drilling activities; re-spreading topsoil/subsoil over drilling/access tracks; and weed management. Refer to Table 19. Rehabilitation of 14 ha of drilling pads and gas drainage infrastructure sites was undertaken during the reporting period. This rehabilitation has occurred up to and including surface areas above LW107 and LW108, and is progressing closely behind the underground extraction area. The ploughing and seeding of areas is limited to the disturbance areas required for surface infrastructure and the mine has progressed the rehabilitation of these sites and will continue to monitor rehabilitation performance to determine if additional seeding is required.

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 19 summarises the rehabilitation status for the Narrabri Mine, also refer to Figure 5. Note that areas for each 'Main Area Type' have been redistributed in this AR to align with definitions in the *Annual Review Guideline* (DP&E 2015).

Table 19: Rehabilitation Status

Mine Area Type	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period 2019 (Forecast)
A. Total mine footprint	232	254	292
B. Total active disturbance	135	120	135
C. Land being prepared for rehabilitation	0	62	75
D. Land under active rehabilitation	156	72	82
E. Completed rehabilitation	39	0	0

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

There were no variations to the mines' MOP during the reporting period.

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 mulch/fertilisers, feral animal and weed control etc.).

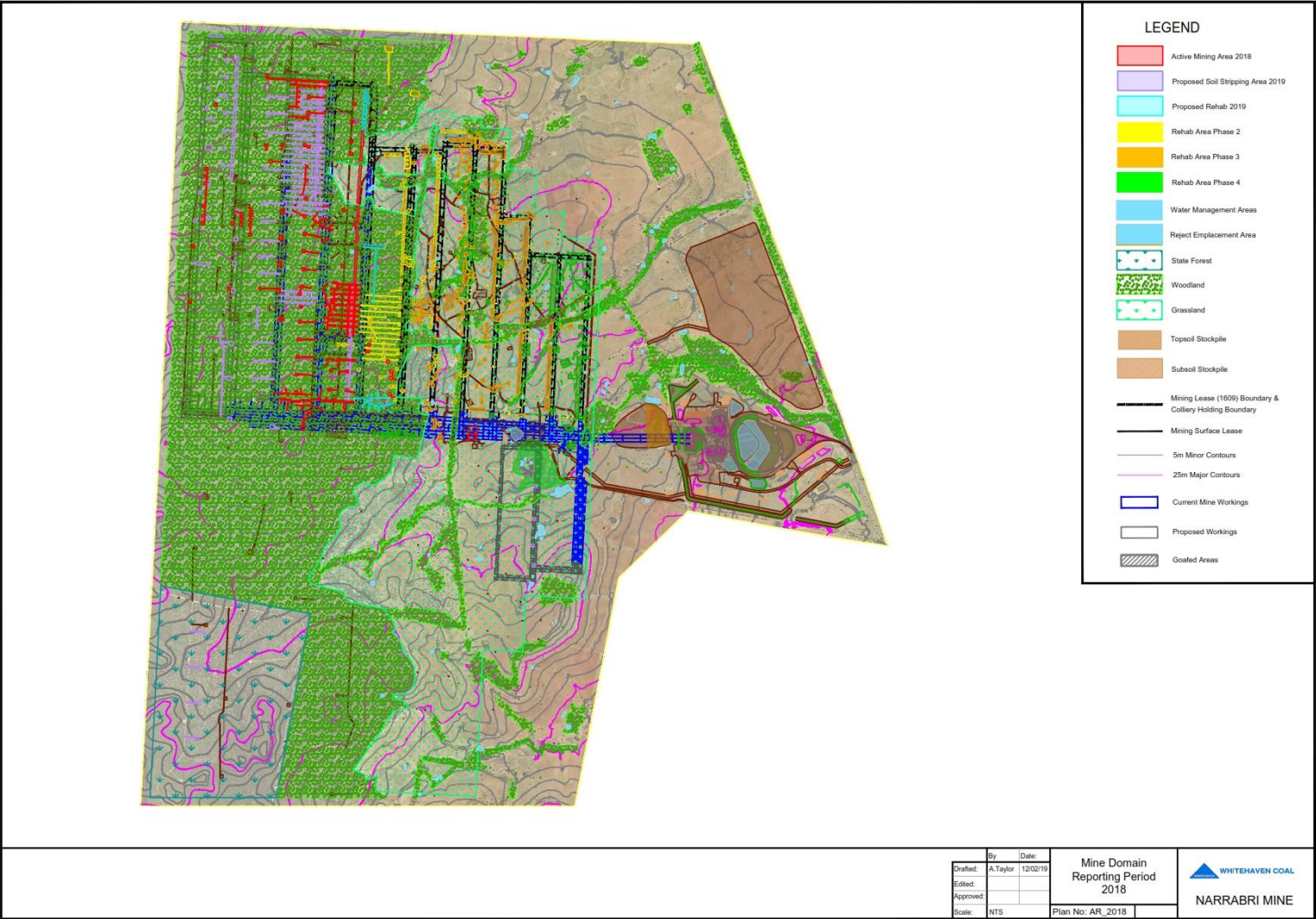


Figure 5: Mine Domains Reporting Period 2018

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 2020. Ploughing and seeding of areas over LW102-LW106 in areas not regenerating will occur during the next reporting period should conditions allow. A review of weeds in this area and additional pest animal control will be undertaken during the next reporting period. This will inform future areas for targeted weed control and increase the mine's current pest control measures.

Additional testing of material emplaced and to be emplaced within the REA was undertaken during the reporting period. Once the review is finalised and the final capping strategy approved, rehabilitation of the REA will commence.

8.1.12 Proposed Research and Rehabilitation for 2019

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 quarterly. The CCC met four times during the reporting period on 7 March 2018, 13 June 2018, 12 September 2018 and 5 December 2018.

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. 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 approximately \$390,000 in financial support and sponsorship to various community events and initiatives during the reporting period.

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 form.

During the reporting period, six complaints were made to the mine from three different complainants. Three 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 20. A Complaints Register summarising the complaints is also available on the Whitehaven Coal website.

Table 20: Summary of Community Complaints and Enquiries

Complaint	Category/ies of complaint
1	Noise
2	Noise
3	Noise
4	Noise, odour, property values, Offset Area consultation
5	Noise
6	Dust

9.3.1 Complaint Trends

A total number of 6 complaints were received during the 2018 reporting period which is lower than the previous reporting period and well down from a peak of 45 complaints received during 2014, refer to

Figure 6. The mine has improved noise and dust management measures at the mine which has led to a drop in complaints from 2014 to 2018.

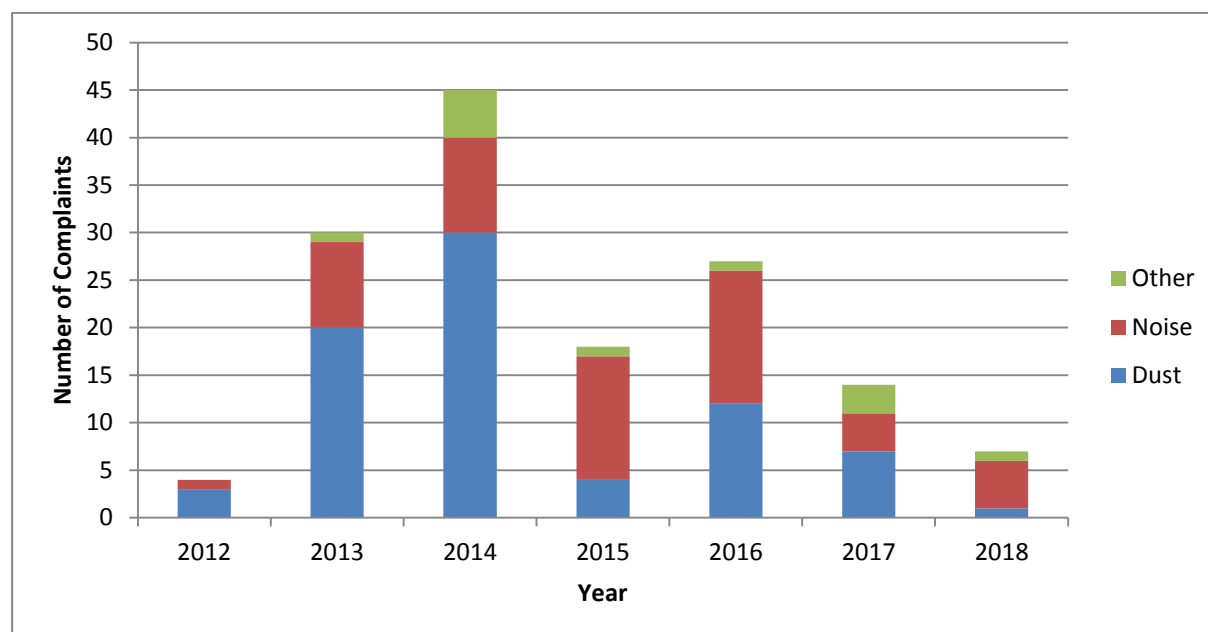


Figure 6: Complaints Trend

9.3.2 Actions & Proposed Improvements

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

- Investigations into specific mining activities;
- Undertake additional attended noise monitoring;
- Reviewing real time monitoring data and operational activities;
- Analysis of meteorological data;
- Implemented corrective actions;
- 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

An Independent Environmental Audit (IEA) was completed during the previous reporting period that covered the period 1 October 2013 to 30 November 2016. The IEA identified 13 non-compliances (7 duplicates) and 8 administrative non-compliances (2 duplicates) against the conditions of consent and the implementation of management plans. Table 21 below outlines how the outstanding actions are being addressed. In accordance with Schedule 6, Condition 7 of PA 08_0144 the next IEA will be commissioned by 13 September 2019.

Table 21: 2016 Independent Audit – Outstanding Actions

Condition/Plan	Proposed Action	Status
PA 08_0144 Schedule 4, Condition 4 Noise Management Plan	The mine will continue the negotiations for purchase and/or the implementation of the NMP.	Ongoing
PA 08_0144 Schedule 4, Condition 22 and 23 Aboriginal Cultural Heritage Management Plan	The mine has reviewed the ACHMP, which includes additional induction material. The Office of Environment and Heritage (OEH) provided comments during November 2017, and it is currently with the RAPs for review. The mine will submit the revised ACHMP to DP&E for approval and continue to implement the existing ACHMP.	The revised ACHMP was submitted to the DP&E in December 2018
PA 08_0144 Schedule 4, Condition 4 Greenhouse Gas Minimisation Plan	As noted in the revised GHGMP, submitted to OEH for review on 26 June 2017, the concentrations required for VAM cannot be <0.2% methane. Current levels in the ventilation air stream are 0.028% methane. Additionally, the latest Emissions Reduction Fund reverse auction price for tCO ₂ -e would mean a payback period of >40 years.	Ongoing

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 December 2018). Further details of any non-compliance and actions undertaken or proposed for the following reporting period is summarised in Table 22.

Table 22: Non-Compliance Details and Proposed Action Plan

Non - Compliance	Date / Location	Cause	Action Plan	Due Date
One noise exceedance was recorded during the reporting period. The relevant Government agencies were notified at the time as required by the NMP.	13 th March 2018 at NMP Monitoring Location N3	Excessive noise from the mining operation – conveyor noise continuum and dozer track noise.	As this was the first exceedance recorded at this location the mine proceeded with the scheduled noise monitoring program with no issues identified.	Complete
The mine reported SPL's which exceeded those identified in the NMP. The DP&E requested additional information in October 2018 which the mine provided. The DP&E issued a Warning Letter in December 2018.	2017 AR	Equipment used that exceeded nominated limits	Equipment has been replaced	Complete
The mine commenced additional testing of the Reject Emplacement Area (REA) during the reporting period but this was not completed within 12 months, i.e. by 28 November 2018.	November 2018	Testing and analysis complete but not reported within nominated timeframe	Finalise results and report and submit to the Resources Regulator	31 July 2019

11.2 REPORTABLE INCIDENTS OR EXCEEDANCES

Details of reportable monitoring exceedances or incidents are included below:

- Noise exceedance, as detailed in Section 6.1.2, was reported to the EPA and DP&E during the reporting period.

11.3 REGULATORY ACTIONS

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

- DP&E issued a Warning Letter to the mine in relation to the Sound Power Levels (SPL's) reported in the 2017 Annual Review (Schedule 4(4)). The mine is required to utilise equipment with SPL's consistent with those identified in the Noise Management Plan (NMP).
- The Resources Regulator issued a Directions Notice under s.240(1)(c) of the *Mining Act 1992* in relation to the Reject Emplacement Area (REA). The mine had previously committed to undertaking additional testing and analysis of the REA in accordance with a consultant's report and while the testing and analysis had been completed the reporting was not completed within 12 months, i.e. by 28 November 2018. The notice also covered an event whereby emplaced material had been placed over a topsoil stockpile which was rectified. The notice required the mine to provide additional information which will be completed with the final REA report due by 31 July 2019.

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;
- Continue to review options for SPL treatments on dozers and investigate gas-drainage infrastructure;
- Ongoing management of weeds and feral animals over the longwall mining area and offset areas;
- Seeking approval to relevant approval modifications or amendments; and
- Continued community liaison and engagement with local stakeholders.

Appendix A – *Flora Species List*

Table A1 Flora Species List Kenna BOA

Scientific name	Common name	Native/ Exotic	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
<i>Abutilon oxycarpum</i>	Straggly Lantern-bush	Native					X	X	X					X										
<i>Acacia cheelii</i>	Motherumbah	Native				X															X			
<i>Acacia decora</i>	Western Silver Wattle	Native										X											X	
<i>Acacia triptera</i>	Spurwing Wattle	Native																			X	X		
<i>Ajuga australis</i>	Austral Bugle	Native			X																			
<i>Alphitonia excelsa</i>	Red Ash	Native				X																		
<i>Alstonia constricta</i>	Quinine Bush	Native	X				X															X		
<i>Alternanthera denticulata</i>	Lesser Joyweed	Native										X												
<i>Alternanthera nana</i>	Hairy Joyweed	Native						X																
<i>Alternanthera sp. A</i>		Native	X					X																
<i>Alternanthera spp.</i>	Joyweed	Native									X													
<i>Amyema miquelii</i>	Box Mistletoe	Native	X																					
<i>Amyema pendula</i>		Native								X	X			X										
<i>Anagallis spp.</i>		Exotic					X									X								
<i>Argemone ochroleuca</i>		Exotic														X								
<i>Aristida contorta</i>	Bunched Kerosene Grass	Native													X									
<i>Aristida jerichoensis</i>	Jericho Wiregrass	Native																	X					
<i>Aristida personata</i>		Native				X																		
<i>Aristida ramosa</i>	Purple Wiregrass	Native									X										X			X
<i>Aristida spp.</i>	A Wiregrass	Native	X	X				X	X	X	X	X	X	X	X	X		X				X	X	
<i>Aristida vagans</i>	Threawn Speargrass	Native	X		X																			
<i>Arthropodium milleflorum</i>	Pale Vanilla-lily	Native						X		X												X		
<i>Asperula conferta</i>	Common Woodruff	Native																			X			
<i>Asperula spp.</i>	Woodruff	Native							X															
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass	Native	X																					
<i>Austrostipa scabra</i>	Speargrass	Native	X	X	X	X		X		X	X	2	X	X	X	X	X	X		X	X	X	X	X
<i>Austrostipa spp.</i>	A Speargrass	Native									X										X	X		
<i>Austrostipa verticillata</i>	Slender Bamboo Grass	Native					X	X	X	X			X	X		X	X							
<i>Beyeria viscosa</i>	Sticky Wallaby Bush	Native			X	X																	X	X
<i>Bidens pilosa</i>	Cobbler's Pegs	High threat					X		X															
<i>Bidens subalternans</i>	Greater Beggar's Ticks	High threat				X							X											
<i>Boerhavia coccinea</i>	Tarvine	Native																X						
<i>Boerhavia dominii</i>	Tarvine	Native	X		X					X	X			X	X			X	X	X				
<i>Boronia spp.</i>		Native																						X
<i>Bothriochloa decipiens</i>	Red Grass	Native									X	X					X	X	X					
<i>Brachychiton populneus</i>	Kurrajong	Native								X			X								X			
<i>Brassicaceae indeterminate</i>	Mustards	Exotic	X																					
<i>Breynia oblongifolia</i>	Coffee Bush	Native							X	X											X			
<i>Bromus catharticus</i>	Praire Grass	Exotic						X								X								
<i>Bromus molliformis</i>	Soft Brome	Exotic															X							
<i>Brunoniella australis</i>	Blue Trumpet	Native		X		X	X				X	X	X	X				X			X		X	X
<i>Bulbine spp.</i>		Native								X			X											
<i>Caesia spp.</i>		Native						X						X										
<i>Callitris glaucophylla</i>	White Cypress Pine	Native	X	X	X	X	X	X		X	X	X		X	X			X			X	X	X	X
<i>Calotis cuneata</i>	Mountain Burr-Daisy	Native									X													
<i>Calotis lappulacea</i>	Yellow Burr-daisy	Native	X	X	X												X	X	X					
<i>Capparis spp.</i>		Native					X																	
<i>Capsella bursa-pastoris</i>	Shepherd's Purse	Exotic						X					X	X		X	X							

Scientific name	Common name	Native/ Exotic	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
<i>Carduus nutans</i>		Exotic		X																				
<i>Carex inversa</i>	Knob Sedge	Native	X				X				X													
<i>Carthamus lanatus</i>	Saffron Thistle	High threat								X				X		X		X	X					
<i>Cassinia quinquefaria</i>		Native				X															X			
<i>Cassinia spp.</i>		Native																					X	
<i>Centaurea melitensis</i>	Maltese Cockspur	Exotic									X				X		2	X						
<i>Centipeda racemosa</i>	Snuffweed	Native								X														
<i>Centipeda spp.</i>		Native																	X					
<i>Chamaesyce drummondii</i>	Caustic Weed	Native				X									X				X		X			
<i>Cheilanthes distans</i>	Bristly Cloak Fern	Native			X																X	X	X	X
<i>Cheilanthes sieberi</i>	Rock Fern	Native	X	X	X	X		X	X		X							X	X	X	X	X	X	X
<i>Chloris spp.</i>		Native										X		X										
<i>Chloris truncata</i>	Windmill Grass	Native	X	X	X			X		X	X	X	X	X	X	X	X		X	X	X			
<i>Chloris ventricosa</i>	Tall Chloris	Native		X			X			X	X		X		X									
<i>Chrysocephalum apiculatum</i>	Common Everlasting	Native									X							X						
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting	Native																					X	
<i>Commelina cyanea</i>	Native Wandering Jew	Native						X		X								X				X		
<i>Cotula australis</i>	Common Cotula	Native					X	X		X				X		X	X							
<i>Crassula spp.</i>	Stonecrop	Native																				X		
<i>Cymbopogon refractus</i>	Barbed Wire Grass	Native	X	X	X	X		X		X	X	X			X		X	X	X	X	X	X	X	X
<i>Cynodon dactylon</i>	Common Couch	Native						X			X	X	X	X										
<i>Cynoglossum australe</i>		Native								X														
<i>Cyperus gracilis</i>	Slender Flat-sedge	Native	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X				X	X	X
<i>Cyperus spp.</i>		Native													X									
<i>Daucus glochidiatus</i>	Native Carrot	Native						X		X					X				X	X	X	X		X
<i>Desmodium brachypodum</i>	Large Tick-trefoil	Native	X	X	X	X	X					X	X					X		X		X	X	X
<i>Desmodium spp.</i>	Tick-trefoil	Native	X		X	X										X		X			X			
<i>Dianella revoluta</i>	Blueberry Lily	Native																			X	X	X	
<i>Dichanthium sericeum</i>	Queensland Bluegrass	Native	X	X							X					X	X			X				
<i>Dichanthium setosum</i>	Bluegrass	Native													X									
<i>Dichondra repens</i>	Kidney Weed	Native	X	X	X		X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X
<i>Dichondra sp. A</i>	Kidney Weed	Native																					X	
<i>Dichopogon fimbriatus</i>	Nodding Chocolate Lily	Native									X	X								X				
<i>Digitaria divaricatissima</i>	Umbrella Grass	Native						X																
<i>Digitaria spp.</i>	A Finger Grass	Native					X			X		X		X			X		X			X		X
<i>Dodonaea viscosa</i>	Sticky Hop-bush	Native								X		X												
<i>Echinochloa crus-galli</i>	Barnyard Grass	Exotic								X						X				X				
<i>Echium plantagineum</i>	Patterson's Curse	Exotic								X														
<i>Einadia hastata</i>	Berry Saltbush	Native	X	X			X	X	X	X	X	X	X	X		X	X	X	X	X				
<i>Einadia nutans</i>	Climbing Saltbush	Native	X				X		X			X												
<i>Einadia polygonoides</i>	Knotweed Goosefoot	Native						X			X			X			X	X		X				
<i>Enneapogon gracilis</i>	Slender Nineawn	Native									X													
<i>Enneapogon nigricans</i>	Niggerheads	Native			X	X						X						X					X	X
<i>Eragrostis curvula</i>	African Lovegrass	High threat																X						
<i>Eragrostis leptostachya</i>	Paddock Lovegrass	Native	X	X		X					X	X					X							X
<i>Eragrostis spp.</i>	A Lovegrass	Native	X	X				X			X													
<i>Eriochloa pseudoacrotricha</i>	Early Spring Grass	Native		X																				
<i>Erodium crinitum</i>	Blue Crowfoot	Native						X																
<i>Erodium spp.</i>	Crowfoot	Native												X				X						
<i>Eucalyptus albens</i>	White Box	Native	X				X				X	X	X	X										

Scientific name	Common name	Native/ Exotic	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
<i>Eucalyptus blakelyi</i>	Blakely's Red Gum	Native							X	X														
<i>Eucalyptus crebra x nubila</i>		Native			X																			
<i>Eucalyptus crebra</i>	Narrow-leaved Ironbark	Native				X	X	X		X	X	X						X						
<i>Eucalyptus dealbata x dwyeri</i>		Native																				X		
<i>Eucalyptus dealbata</i>	Tumbledown Red Gum	Native																			X			X
<i>Eucalyptus melanophloia</i>	Silver-leaved Ironbark	Native																					X	X
<i>Euphorbia drummondii</i>		Native	X											X						X		X		
<i>Euphorbia spp.</i>		Native											X							X				
<i>Evolvulus alsinoides var. decumbens</i>		Native																		X				
<i>Foeniculum vulgare</i>	Fennel	Exotic															X							
<i>Fumaria spp.</i>	Fumitory	Exotic						X																
<i>Galium gaudichaudii</i>	Rough Bedstraw	Native																				X		X
<i>Galium spp.</i>		Native						X																
<i>Geijera parviflora</i>	Wilga	Native	X		X		X	X	X	X	X	X	X											X
<i>Geranium solanderi</i>	Native Geranium	Native		X			X	X	X	X											X	X		
<i>Glandularia aristigera</i>	Mayne's Pest	Exotic														X				X				
<i>Glossocardia bidens</i>	Cobbler's Tack	Native	X		X						X	X						X						
<i>Glycine clandestina</i>	Twining glycine	Native			X		X				X			X	X									
<i>Glycine spp.</i>		Native	X					X					X											
<i>Glycine tabacina</i>	Variable Glycine	Native	X	X	X	X	X		X	X	X	X	X	X	X			X			X		X	X
<i>Gonocarpus elatus</i>	A Raspwort	Native				X																		
<i>Hedypnois rhagadioloides</i>	Cretan Weed	Exotic	X	X						X	X			X	X					X				
<i>Hordeum leporinum</i>	Barley Grass	Exotic														X	X							
<i>Hordeum vulgare</i>	Barley	Exotic						X					X	X										
<i>Hypochaeris glabra</i>	Smooth Catsear	Exotic								X	X				X		X		X	X	X	X		X
<i>Hypochaeris radicata</i>	Catsear	Exotic																	X					
<i>Jasminum lineare</i>	Desert Jasmine	Native		X			X		X				X											
<i>Juncus spp.</i>	A Rush	Native									X	X												
<i>Lactuca serriola</i>	Prickly Lettuce	Exotic														X								
<i>Lamium amplexicaule</i>	Dead Nettle	Exotic													X									
<i>Lepidium africanum</i>	Common Peppercross	Exotic	X					X			X			X		X	X		X					
<i>Leucopogon spp.</i>	A Beard-heath	Native																				X		
<i>Linaria arvensis</i>		Exotic																		X				
<i>Linum spp.</i>		Native								X												X		X
<i>Lolium perenne</i>	Perennial Ryegrass	Exotic						X							X				X	X				
<i>Lolium spp.</i>	A Ryegrass	Exotic												X										
<i>Lomandra multiflora</i>	Many-flowered Mat-rush	Native				X						X											X	X
<i>Lycium ferocissimum</i>	African Boxthorn	High threat	X				X	X		X			X	X										
<i>Lysimachia arvensis</i>	Scarlet Pimpernel	Exotic								X	X								X		X	X		
<i>Maireana microphylla</i>	Small-leaf Bluebush	Native		X			X	X					X	X	X		X							
<i>Maireana spp.</i>	Cotton Bush, Bluebush, Fissure-weed	Native	X								X													
<i>Malva neglecta</i>	Dwarf Mallow	Exotic						X					X	X		X	X	X						
<i>Malvaceae indeterminate</i>	Mallows, jutes and lantern bushes	Exotic	X																					
<i>Marrubium vulgare</i>	White Horehound	Exotic											X											
<i>Marsdenia viridiflora</i>	Native Pear	Native	X		X	X	X											X						
<i>Medicago polymorpha</i>	Burr Medic	Exotic		X						X	X	X	X	X	X	X	X	X		X				
<i>Medicago truncatula</i>	Barrel Medic	Exotic						X								X								
<i>Melaleuca bracteata</i>	Black Tea-tree	Native					X	X	X	X														
<i>Melaleuca spp.</i>		Native																					X	

Scientific name	Common name	Native/ Exotic	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
<i>Melichrus urceolatus</i>	Urn Heath	Native																					X	
<i>Microlaena stipoides</i>	Weeping Grass	Native	X		X			X	X	X				X				2						
<i>Micromyrtus sessilis</i>		Native																			X	X		
<i>Mimulus gracilis</i>	Slender Monkey-flower	Native										X			X									
<i>Mimulus prostratus</i>	Small Monkey-flower	Native										X					X	X					X	
<i>Misopates orontium</i>	Lesser Snapdragon	Exotic								X					X		X		X	X	X			
<i>Murdannia graminea</i>		Native										X												
<i>Myoporum montanum</i>	Western Boobialla	Native	X																					
<i>Notelaea microcarpa</i>	Native Olive	Native	X				X	X	X		X		X								X			
<i>Notothixos cornifolius</i>	Kurrajong Mistletoe	Native								X														
<i>Olearia spp.</i>		Native																					X	
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic						X		X									X	X	X			X
<i>Oxalis chnoodes</i>		Native						X																
<i>Oxalis perennans</i>		Native	X	X	X		X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X
<i>Oxalis spp.</i>		Native		X																				
<i>Pandorea pandorana</i>	Wonga Wonga Vine	Native																			X			
<i>Panicum effusum</i>	Hairy Panic	Native			X										X				X					
<i>Panicum spp.</i>	Panicum	Native			X																			
<i>Parsonsia eucalyptophylla</i>	Gargaloo	Native			X	X	X	X		X	X	X	X	X									X	
<i>Parsonsia spp.</i>		Native	X																					X
<i>Paspalidium spp.</i>		Native	X	X				X	X		X	X	X	X				X		X		X	X	X
<i>Petrorhagia nanteulii</i>		Exotic								X			X		X				X					
<i>Phyllanthus spp.</i>		Native	X	X																				
<i>Phyllanthus virgatus</i>	Wiry Spurge	Native	X	X	X						X	X	X		X		X	X	X	X	X		X	
<i>Pimelea neo-anglica</i>	Poison Pimelea	Native	X	X	X		X			X		X	X					X			X	X	X	X
<i>Pimelea spp.</i>		Native																						X
<i>Pittosporum angustifolium</i>	Butterbush	Native					X																	
<i>Plantago debilis</i>	Shade Plantain	Native					X	X	X													X		
<i>Plectranthus parviflorus</i>		Native						X																
<i>Poa sieberiana</i>	Snowgrass	Native																			X			
<i>Polygonum aviculare</i>	Wireweed	Exotic														X								
<i>Pomaderris spp.</i>		Native		X																				
<i>Poranthera microphylla</i>	Small Poranthera	Native																			X			
<i>Portulaca oleracea</i>	Pigweed	Native	X															X				X		
<i>Portulaca spp.</i>		Native									X										X			X
<i>Psydrax odorata</i>	Shiny-leaved Canthium	Native								X		X									X			
<i>Rapistrum rugosum</i>	Turnip Weed	Exotic						X																
<i>Romulea spp.</i>		Exotic																			X			
<i>Rostellularia adscendens</i>	Pink Tongues	Native										X												
<i>Rumex brownii</i>	Swamp Dock	Native							X					X	X	X	X	X		X				
<i>Rytidosperma longifolium</i>	Long-leaved Wallaby Grass	Native	X				X				X										X			X
<i>Rytidosperma racemosum</i>	Wallaby Grass	Native	X											X										
<i>Rytidosperma spp.</i>		Native	X								X		X	X										X
<i>Salvia reflexa</i>	Mintweed	Exotic														X								
<i>Salvia spp.</i>		Native													X									
<i>Scleria mackaviensis</i>		Native																					X	X
<i>Sclerolaena birchii</i>	Galvanized Burr	Native	X	X									X	X										
<i>Senecio spp.</i>	Groundsel, Fireweed	Native																						X
<i>Sida corrugata</i>	Corrugated Sida	Native	X	X			X			X	X	X	X	X			X	X					X	X
<i>Sida cunninghamii</i>	Ridge Sida	Native	X										X					X						

Scientific name	Common name	Native/ Exotic	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
<i>Sida rhombifolia</i>	Paddy's Lucerne	Exotic																		X				
<i>Sida spinosa</i>		Exotic								X	X		X	X	X	X	X	X	X	X				
<i>Sigesbeckia orientalis</i>		Native								X				X						X	X	X		X
<i>Sisymbrium irio</i>	London Rocket	Exotic								X				X										
<i>Sisymbrium officinale</i>	Hedge Mustard	Exotic		X				X																
<i>Sisymbrium spp.</i>		Exotic					X						X	X		X	X							
<i>Solanum esuriale</i>	Quena	Native									X													
<i>Solenogyne bellioides</i>	Solengyne	Native									X	X												
<i>Solenogyne spp.</i>		Native			X																	X	X	
<i>Sonchus asper</i>	Prickly Sowthistle	Exotic													X									
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic						X	X	X			X					X			X	X		
<i>Sporobolus caroli</i>	Fairy Grass	Native	X				X																	
<i>Sporobolus creber</i>	Slender Rat's Tail Grass	Native	X			X						X								X	X			
<i>Sporobolus spp.</i>	Rat's Tail Couch	Native																	X					
<i>Stackhousia monogyna</i>	Creamy Candles	Native			X																		X	
<i>Stackhousia viminea</i>	Slender Stackhousia	Native													X			X						
<i>Swainsona spp.</i>		Native						X																
<i>Teucrium spp.</i>		Native			X								X					X						
<i>Tribulus micrococcus</i>	Spineless Caltrop	Native	X	X				X		X			X			X		X	X	X				
<i>Trifolium arvense</i>	Haresfoot Clover	Exotic																		X				
<i>Trifolium spp.</i>	A Clover	Exotic																	X					
<i>Triptilodiscus pygmaeus</i>	Common Sunray	Native																			X	X		
<i>Urtica incisa</i>	Stinging Nettle	Native						X	X															
<i>Vittadinia cuneata</i>	A Fuzzweed	Native	X	X			X				X	X		X	X			X	X	X	X		X	X
<i>Vittadinia muelleri</i>	A Fuzzweed	Native								X								X				X		
<i>Vittadinia sulcata</i>		Native															X							
<i>Vulpia spp.</i>	Rat's-tail Fescue	Exotic																			X	X		
<i>Wahlenbergia communis</i>	Tufted Bluebell	Native						X									X							X
<i>Wahlenbergia spp.</i>	Bluebell	Native		X						X	2				X	X	X	X	X	X	X	X		

Table A2 Flora Species List Mine BOA

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
20m x 20m Plots																	
<i>Acacia burrowii</i>	Burrow's wattle	Native										3	3	2	3		
<i>Acacia deanei</i>	Green wattle, Dean's wattle	Native	3				1		1		3						1
<i>Acacia gladiformis</i>	Sword wattle	Native									1						
<i>Acacia ixiophylla</i>	Sticky leaved wattle	Native					1										
<i>Acacia leiocalyx</i>	Lamb's Tail Wattle	Native				3								2	2	3	1
<i>Acacia penninervis</i>	Mountain hickory	Native									3						
<i>Acacia sp.</i>		Native															1
<i>Allocasuarina diminuta</i>		Native									2						
<i>Allocasuarina luehmannii</i>	Bulloak	Native														3	
<i>Allocasuarina sp.</i>		Native													1		
<i>Alphitonia excelsa</i>	Red Ash	Native					1				2	1					1
<i>Alstonia constricta</i>	Quinine Bush, Bitter Bark	Native											1				1
<i>Alternanthera denticulata</i>	Lesser Joyweed	Native															1
<i>Anagallis arvensis</i>	Scarlet Pimpernel	Exotic						3	2								
<i>Aristida caput-medusae</i>	Many-headed Wiregrass	Native					3				2	1	2			2	2
<i>Aristida personata</i>	Purple Wire-grass	Native			2		2	3	4	3	3	3	2	2	1		3
<i>Austrostipa ramosissima</i>	Stout Bamboo Grass	Native	3	3	3					2						3	
<i>Austrostipa scabra</i>	Speargrass	Native	2	3	1		3			3	1		2			2	3
<i>Austrostipa verticillata</i>	Slender Bamboo Grass	Native											1				
<i>Boerhavia dominii</i>	Tarvine	Native		1													
<i>Boronia glabra</i>		Native									2						
<i>Boronia anethifolia</i>		Native									1						
<i>Bothriochloa decipiens</i>	Red Grass	Native						3	3								
<i>Brunonia australis</i>	Blue Pincushion	Native		1													
<i>Brunoniella australis</i>	Blue Trumpet	Native			2		1									3	1
<i>Bryophyllum delagoense</i>	Mother of millions	Exotic	2	1	2												
<i>Callitris endlicheri</i>	Black Cypress Pine	Native								2				4	1		1
<i>Callitris glaucophylla</i>	White Cypress Pine	Native					1		1		4		1				3
<i>Calotis cuneifolia</i>	Purple Burr-daisy	Native								1	1					1	
<i>Calotis lappulacea</i>	Yellow Burr-daisy	Native			1												
<i>Calytrix tetragona</i>	Common Fringe-myrtle	Native								3	2						
<i>Capparis mitchellii</i>	Native Orange	Native		1													
<i>Carex inversa</i>		Native			1				3								1
<i>Carthamus lanatus</i>	Saffron Thistle	Exotic						2									
<i>Cassinia arcuata</i>	Sifton Bush	Native									1			1			
<i>Cassytha glabella</i>	Slender Devils Twine	Native				2	1										
<i>Casuarina cristata</i>	Belah	Native	3														
<i>Centaurea melitensis</i>		Exotic						1									
<i>Cheilanthes sieberi</i>	Mulga Fern	Native		1			2	2	2	2	2	2	3	1			2
<i>Chrysocephalum apiculatum</i>	Yellow Buttons	Native						1		1							1
<i>Chrysocephalum semipapposum</i>	Clustered Everlasting, Yellow Buttons	Native								3	3						1

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
<i>Cirsium vulgare</i>	Spear Thistle	Exotic						1									
<i>Convolvulus graminetinus</i>		Native						1									
<i>Corymbia trachyphloia</i>	White / Brown Bloodwood	Native				3					4		3	2	3		
<i>Crinum flaccidum</i>		Native	1														
<i>Cyclospermum leptophyllum</i>	Slender Celery	Exotic						1									
<i>Cymbopogon refractus</i>	Barbed Wire Grass	Native					1	3	3		2		2			2	3
<i>Cynodon dactylon</i>	Common Couch	Native							2								
<i>Dampiera sp.</i>		Native												1	1		
<i>Daucus glochidiatus</i>	Native Carrot	Native								1							
<i>Denhamia cunninghamii</i>		Native					1										1
<i>Dianella revoluta</i>	Blue Flax-Lily	Native				1	2									1	
<i>Dianella revoluta</i> var. <i>revoluta</i>	Blue Flax-Lily	Native								1	2						2
<i>Dichondra repens</i>	Kidney Weed	Native	1	1	1											1	
<i>Dichondra sp. A</i>		Native							2								
<i>Digitaria breviglumis</i>		Native									1	1		1	1		1
<i>Dodonaea viscosa</i>	Sticky Hop-bush	Native					3				1						1
<i>Dodonaea sp.</i>	Hop-bush	Native												1			
<i>Echium plantagineum</i>	Paterson's Curse	Exotic						3	3								
<i>Einadia hastata</i>	Berry Saltbush, Saloop	Native															1
<i>Einadia nutans</i> subsp. <i>nutans</i>	Climbing Saltbush	Native								1							
<i>Einadia polygonoides</i>		Native		1													
<i>Einadia trigonos</i>	Fishweed	Native	1	2	2			1									
<i>Enchylaena tomentosa</i>	Ruby Saltbush	Native	1	1	1												1
<i>Enneapogon sp.</i>		Native														1	
<i>Enteropogon acicularis</i>		Native	2		1												
<i>Enteropogon sp.</i>		Native		1													
<i>Entolasia stricta</i>	Wiry panic	Native	1		1	4							2		3		
<i>Eragrostis curvula</i>	African Lovegrass	Exotic							3								
<i>Eragrostis elongata</i>	Clustered Lovegrass	Native							2								
<i>Eragrostis lacunaria</i>	Purple Love-grass	Native	1	3	1						1						
<i>Eragrostis brownii</i>	Brown's Lovegrass	Native							1								
<i>Eremophila debilis</i>	Winter Apple	Native	1														
<i>Eremophila mitchellii</i>	Budda	Native		2		2											
<i>Eucalyptus beyeriana</i>	Beyer's Ironbark	Native													1	3	3
<i>Eucalyptus chloroclada</i>	Dirty Gum, Red Gum	Native								3	3						
<i>Eucalyptus crebra</i>	Narrow-leaved ironbark	Native				2	3										2
<i>Eucalyptus dwyeri</i>	Dwyer's Red Gum	Native											2				
<i>Eucalyptus fibrosa</i>	Red Ironbark, Broad-leaved ironbark	Native				3	3					1	3	2			
<i>Eucalyptus microcarpa</i>	Grey Box, Inland Box	Native	3	3		3			1								
<i>Eucalyptus viridus</i>	Green Mallee	Native															1
<i>Euphorbia drummondii</i>	Caustic weed	Native							1		1						1
<i>Gahnia aspera</i>	Rough Saw-sedge	Native					1			2	3					1	1
<i>Geijera parviflora</i>	Wilga	Native	2	2		2											1

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
<i>Glandularia aristigera</i>	Mayne's Pest	Exotic	1					3	3								
<i>Glycine clandestina</i>		Native	1	1	1		1			1						1	1
<i>Glycine tabacina</i>		Native	1		1		1		3	1			1				
<i>Gonocarpus elatus</i>		Native												1	1		
<i>Goodenia glabra</i>		Native								1							
<i>Goodenia rotunaifolia</i>		Native				1	1				2	1	1	1	1		1
<i>Grevillea floribunda</i>		Native									2						
<i>Haloragis sp.</i>		Native								1							
<i>Harmogia densifolia</i>		Native				2											
<i>Hedypnois rhagadioloides</i>		Exotic						2	2								
<i>Hibbertia sp.</i>		Native				1	1										
<i>Hibiscus sturtii</i>	Hill Hibiscus	Native														1	
<i>Homoranthus flavescens</i>		Native								2	3	1					2
<i>Hypochaeris glabra</i>	Smooth Catsear	Exotic								1							
<i>Hypochaeris radicata</i>	Catsear	Exotic							2								
<i>Hypochaeris sp.</i>		Exotic						2									
<i>Indigofera adesmiifolia</i>	Tick Indigo	Native					1										
<i>Indigofera australis</i>	Australian Indigo	Native															1
<i>Jasminum suavisissimum</i>		Native	1														
<i>Juncus sp.</i>		Native							2								
<i>Korthasella rubra subsp. geijericola</i>		Native		1													
<i>Lepidosperma laterale</i>	Variable Sword-sedge	Native				1				1	3		1				
<i>Leptospermum polygafolium</i>	Tantoon	Native															1
<i>Lolium sp.</i>	Ryegrass	Exotic						1									
<i>Lomandra confertifolia</i>	Mat-rush	Native	3														
<i>Lomandra multiflora</i>	Many-flowered Mat-rush	Native					1			2	1		1				1
<i>Lomandra sp.</i>	Mat-rush	Native				1										1	
<i>Lomandra filiformis</i>	Wattle Mat-rush	Native														2	
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic		1													
<i>Macrozamia glaucophylla</i>		Native								1							
<i>Maireana enchylaenoides</i>	Wingless Bluebush	Native	1	1	1												
<i>Maireana microphylla</i>	Small-leaf Bluebush	Native	1	1	1												
<i>Marsdenia viridiflora</i>	Native Pear	Native		1	1						1		1	1			1
<i>Medicago minima</i>		Exotic						1									
<i>Melaleuca uncinata</i>	Broombush	Native					1										
<i>Melichrus erubescens</i>	Ruby Urn Heath	Native				1									1		
<i>Melichrus urceolatus</i>	Urn Heath	Native								2	2						
<i>Microlaena stipoides</i>	Weeping Grass	Native								1	1	1				2	2
<i>Nyssanthus erecta</i>		Native	1														
<i>Olea sp.</i>	Olive	Exotic	1														
<i>Olearia decurrens</i>	Clammy Daisy-bush	Native														2	
<i>Olearia sp.</i>		Native									1						
<i>Opercularia sp.</i>		Native															1

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
<i>Opuntia stricta</i>	Common Prickly Pear	Exotic	1	1	1			1									
<i>Oxalis perennans</i>		Native					1									1	
<i>Oxalis sp.</i>		Exotic	2	1				1		1	1	1					1
<i>Panicum effusum</i>	Hairy Panic	Native									1						1
<i>Panicum maximum</i>	Green Panic	Exotic						2									
<i>Panicum sp.</i>		Native					2										
<i>Parsonsia eucalyptophylla</i>	Gargaloo	Native		1												1	
<i>Paspalidium gracile</i>	Slender Panic	Native	2	1						1	1	1					2
<i>Patersonia sp.</i>		Native															1
<i>Persoonia sericea</i>		Native													1		
<i>Petrorhagia nanteuilii</i>	Childling Pink	Exotic						1	1								
<i>Phebalium squamulosum</i>	Scaly Phebalium	Native				5	4			1	2	2	3	3	3	2	
<i>Philotheca ciliata</i>		Native				2	2			3	1	3	2	3	3	2	2
<i>Phyllanthus virgatus</i>		Native	1	1			1	1			1						1
<i>Pomax umbellata</i>	Pomax	Native								1	1				1		1
<i>Portulaca oleracea</i>	Pigweed	Native		1													
<i>Portulaca pilosa</i>	Akulikuli	Exotic	1														
<i>Rostellularia adscendens</i>		Native		1													
<i>Rumex sp.</i>		Native						2									
<i>Rytidosperma sp.</i>		Native	1	2	1											2	
<i>Schkuhria pinnata</i> var. <i>abrotanoides</i>		Exotic							3								
<i>Schoenus ericetorum</i>	Heath Bog-rush	Native				1								2			
<i>Sclerolaena birchii</i>	Galvanized Burr	Native	1	1													
<i>Sclerolaena muricata</i> var. <i>villosa</i>	Black Rolypoly	Native		1													
<i>Senna artemisioides</i>	Silver Cassia	Native								1							
<i>Sida corrugata</i>	Corrugated Sida	Native		1	1		1										
<i>Sida cunninghamii</i>	Ridged Sida	Native	1										1				
<i>Sida hackettiana</i>	Spiked Sida	Native						2									
<i>Sida sp.</i>		Native							1							1	1
<i>Sida spinosa</i>		Exotic											1			2	1
<i>Silene gallica</i>	French Catchfly	Exotic							2								
<i>Solanum ferocissimum</i>	Spiny Potato Bush	Native					1			1		3				2	1
<i>Solanum parvifolium</i>		Native	2	1	1											3	1
<i>Solanum jucundum</i>		Native								1						2	1
<i>Sonchus oleraceus</i>	Common Sowthistle	Exotic						2									
<i>Spartothamnella puberula</i>		Native	1														
<i>Sporobolus creber</i>	Western Rat-tail Grass	Native							2								
<i>Taraxacum officinale</i>	Dandelion	Native							2								
<i>Teucrium puberulum</i>	Red Berry Stick Plant	Native					1										
<i>Themeda avenaceus</i>		Native								1							
<i>Thyridolepis mitchelliana</i>		Native					2			3	2	3	3				2
<i>Trifolium campestre</i>	Hop Clover	Exotic						1									
<i>Tylophora linearis</i>		Native		1												1	1

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
<i>Vernonia cinerea</i>		Native															1
<i>Vittadinia cuneata</i>	Fuzzweed	Native							1	1							
<i>Vulpia sp.</i>		Exotic							2								
<i>Wahlenbergia sp.</i>		Native							2								
<i>Walwhalleya proluta</i>		Native										1					
20m x 50m Plots Overstorey																	
<i>Brachychiton populneus</i>	Kurrajong	Native					1					2					
<i>Callitris endlicheri</i>	Black Cypress Pine	Native								2	3						
<i>Callitris glaucophylla</i>	White Cypress Pine	Native					1		3	2							3
<i>Casuarina cristata</i>	Belah	Native	4	1													
<i>Corymbia trachyphloia</i>	White / Brown Bloodwood	Native				3				3	3		3	3	3		
<i>Eucalyptus beyeriana</i>	Beyer's Ironbark	Native													3	4	4
<i>Eucalyptus chloroclada</i>	Dirty Gum, Red Gum	Native								3	3						
<i>Eucalyptus crebra</i>	Narrow-leaved ironbark	Native					3									2	2
<i>Eucalyptus dwyeri</i>	Dwyer's Red Gum	Native								2	1		2				
<i>Eucalyptus fibrosa</i>	Red Ironbark, Broad-leaved ironbark	Native				3	3				3	2	3	2			
<i>Eucalyptus microcarpa</i>	Grey Box, Inland Box	Native	3	3	3												
<i>Eucalyptus viridus</i>	Green Mallee	Native														2	
20m x 50m Plots Midstorey																	
<i>Acacia burrowii</i>	Burrow's wattle	Native				3				2				3	3		2
<i>Acacia cheelii</i>	Motherumbah	Native				3											
<i>Acacia deanei</i>	Green wattle, Dean's wattle	Native	3				1		1	1	3						
<i>Acacia gladiformis</i>	Sword wattle	Native									1						
<i>Acacia ixiophylla</i>	Sticky leaved wattle	Native					1										
<i>Acacia leiocalyx</i>	Lamb's Tail Wattle	Native											2	3	3	3	3
<i>Acacia oswaldii</i>	Umbrella wattle	Native		1													
<i>Acacia penninervis</i>	Mountain hickory	Native								3	2						
<i>Allocasuarina diminuta</i>		Native				1					3						
<i>Allocasuarina luehmannii</i>	Bulloak	Native							1							3	
<i>Allocasuarina sp.</i>		Native													1		
<i>Alphitonia excelsa</i>	Red Ash	Native					1					2	1				
<i>Alstonia constricta</i>	Quinine Bush, Bitter Bark	Native							1				1				
<i>Bertya opposens</i>		Native											1				
<i>Brachychiton populneus</i>	Kurrajong	Native															1
<i>Callitris endlicheri</i>	Black Cypress Pine	Native												4	3		
<i>Callitris glaucophylla</i>	White Cypress Pine	Native	1		1				3								1
<i>Calytrix tetragona</i>	Common Fringe-myrtle	Native								2	3						
<i>Capparis mitchellii</i>	Native Orange	Native		2													
<i>Cassinia arcuata</i>	Sifton Bush	Native															1
<i>Casuarina cristata</i>	Belah	Native	3														
<i>Corymbia trachyphloia</i>	White / Brown Bloodwood	Native									4						
<i>Denhamia cunninghamii</i>		Native															1
<i>Dodonaea viscosa</i>	Sticky Hop-bush	Native					3										

Scientific name	Common Name	Native / Exotic	S12 Rep	S13	S13 Rep	S14	S14 Rep	S15	S15 Rep	S16	S16 Rep	S17	S17 Rep	S18	S18 Rep	S19	S19 Rep
<i>Eremophila mitchellii</i>	Budda	Native		3	3						2						
<i>Eucalyptus beyeriana</i>	Beyer's Ironbark	Native														3	
<i>Eucalyptus dwyeri</i>	Dwyer's Red Gum	Native				1								1			1
<i>Eucalyptus sp.</i>		Native							1								
<i>Eucalyptus viridus</i>	Green Mallee	Native															1
<i>Exocarpos cupressiformis</i>	Cherry Ballart	Native															2
<i>Geijera parviflora</i>	Wilga	Native	3	2	3				1								
<i>Harmogia densifolia</i>		Native				2											
<i>Indigofera adesmiifolia</i>	Tick Indigo	Native															1
<i>Lycium ferocissimum</i>	African Boxthorn	Exotic	1						1								
<i>Marsdenia viridiflora</i>	Native Pear	Native											1				
<i>Melaleuca uncinata</i>	Broombush	Native					1										
<i>Olea sp.</i>	Olive	Exotic	1														
<i>Olearia decurrens</i>	Clammy Daisy-bush	Native														2	
<i>Parsonsia eucalyptophylla</i>	Gargaloo	Native		2	2												
<i>Persoonia sericea</i>		Native								1					1		
<i>Phebalium squamulosum</i>	Scaly Phebalium	Native				4	3			3	3	3	4	3	3	2	2
<i>Philotheca ciliata</i>		Native				3	3			3	2	3	3	3	3	2	2
<i>Pittosporum angustifolium</i>	Weeping Pittosporum	Native		1													
<i>Senna artemisioides</i>	Silver Cassia	Native								2							
<i>Xanthorrhoea sp.</i>		Native								1							
<i>Acacia burrowii</i>	Burrow's wattle	Native				3				2				3	3		2

Appendix B – *Photo Monitoring Points*



Kenna BOA Site 1 2012



Kenna BOA Site 1 2017



Kenna BOA Site 1 2018



Kenna BOA Site 1 Rep 2012



Kenna BOA Site 1 Rep 2017



Kenna BOA Site 1 Rep 2018



Kenna BOA Site 2 2012



Kenna BOA Site 2 2017



Kenna BOA Site 2 2018



Kenna BOA Site 2 Rep 2012



Kenna BOA Site 2 Rep 2017



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Kenna BOA Site 11 2017



Kenna BOA Site 11 2018



Kenna BOA Site 11 Rep 2012



Kenna BOA Site 11 Rep 2017



Kenna BOA Site 11 Rep 2018



Mine BOA S12 2012

Site not located in 2017.

Mine BOA S12 2017

Site not located in 2018.

Mine BOA S12 2018



Mine BOA S12 Rep 2012



Mine BOA S12 Rep 2017



Mine BOA S12 Rep 2018



Mine BOA S13 2012



Mine BOA S13 2017



Mine BOA S13 2018



Mine BOA S13 Rep 2012



Mine BOA S13 Rep 2017



Mine BOA S13 Rep 2018



Mine BOA S14 2012



Mine BOA S14 2017



Mine BOA S14 2018



Mine BOA S14 Rep 2012



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Mine BOA S19 2012



Mine BOA S19 2017



Mine BOA S19 2018



Mine BOA S19 Rep 2012



Mine BOA S19 Rep 2017



Mine BOA S19 Rep 2018

Appendix C – *Fauna Species List*

Table C1 Fauna Species List Kenna BOA

Common name	Scientific name	Status	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	TB1	TB2	O
Diurnal bird counts																
Apostlebird	<i>Struthidea cinerea</i>		1				4		3	8	4			12		X
Australasian Pipit	<i>Anthus novaeseelandiae</i>		1							2						X
Australian Hobby	<i>Falco longipennis</i>						1			1						
Australian King-parrot	<i>Alisterus scapularis</i>					1			1			4				
Australian Magpie	<i>Cracticus tibicen</i>		2	1	3		2	1		1	2	1		1		X
Australian Owllet-nightjar	<i>Aegotheles cristatus</i>															X
Australian Raven	<i>Corvus coronoides</i>		1	1		1			2	1		1		1	1	X
Australian Wood Duck	<i>Chenonetta jubata</i>								6		8					X
Bar-shouldered Dove	<i>Geopelia humeralis</i>		1													X
Black-eared Cuckoo	<i>Chalcites osculans</i>								1	1	1					
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>		1			1	2	2		4	1			1		X
Blue Bonnet	<i>Northiella haematogaster</i>							4								X
Blue-faced Honeyeater	<i>Entomyzon cyanotis</i>															X
Brown Falcon	<i>Falco berigora</i>				1			1			1					
Brown Honeyeater	<i>Lichmera indistincta</i>										1					
Brown Quail	<i>Coturnix ypsilophora</i>											1		1	1	
Brown Songlark	<i>Megalurus cruralis</i>			1	2	2	2	4	2	3				3		
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>											3				
Brush Cuckoo	<i>Cacomantis variolosus</i>				1											
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>										1					
Cicadabird	<i>Coracina tenuirostris</i>											1				
Common Bronzewing	<i>Phaps chalcoptera</i>		5	1	3					2	2	2	1			X
Common Myna	<i>Sturnus tristis</i>	Exotic														X
Common Starling	<i>Sturnus vulgaris</i>	Exotic														X
Crested Pigeon	<i>Ocyphaps lophotes</i>		3				2	2	1	2				1	2	X
Crimson Rosella	<i>Platycercus elegans</i>												1			
Dollarbird	<i>Eurystomus orientalis</i>															X
Double-barred Finch	<i>Taeniopygia bichenovii</i>		2	2	3	2							3	3	2	X
Dusky Woodswallow	<i>Artamus cyanopterus</i>	V	30			2			100				20		40	
Eastern Koel	<i>Eudynamys orientalis</i>												1			
Eastern Rosella	<i>Platycercus eximius</i>		1				1	2	1	2	2				1	X
Eastern Yellow Robin	<i>Eopsaltria australis</i>				1	1	1				1				1	
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>		1	1	1		1		1		1			1	1	
Fuscous Honeyeater	<i>Lichenostomus fuscus</i>														4	
Galah	<i>Eolophus roseicapillus</i>				3		2		3		5	3				X
Golden Whistler	<i>Pachycephala pectoralis</i>												1			
Grey Butcherbird	<i>Cracticus torquatus</i>		1			1	3				1	1				X
Grey Fantail	<i>Rhipidura albiscapa</i>		2	2	1	2			1		1	2	1			X
Grey Shrike-thrush	<i>Colluricincla harmonica</i>		1							1		1	1		1	
Grey Teal	<i>Anas gracilis</i>										2					
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	V						7		4						
Ground Cuckoo-shrike	<i>Coracina maxima</i>															X
Horsefield's Bronze-Cuckoo	<i>Chalcites basalıs</i>		1				1		1	1	1	1	1		1	
Inland Thornbill	<i>Acanthiza apicalis</i>											5	3			
Jacky Winter	<i>Microeca fascınans</i>		2			3		1							1	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>										1					X
Leaden Flycatcher	<i>Myiagra rubecula</i>		1			2			1			1	2			
Little Friarbird	<i>Philemon citreogularis</i>		2	2	1	1		6	1	1	1			1	1	
Magpie-lark	<i>Grallina cyanoleuca</i>		1	1	2		1	2		1	2			2	1	X
Masked Lapwing	<i>Vanellus miles</i>			2												X
Masked Woodswallow	<i>Artamus personatus</i>		10			3	15	2	50	20					20	
Mistletoebird	<i>Dicaeum hirundinaceum</i>											2		1		
Musk Lorikeet	<i>Glossopsitta concinna</i>														5	
Nankeen Kestrel	<i>Falco cenchroides</i>							1	1					1		X

Common name	Scientific name	Status	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	TB1	TB2	O
Noisy Friarbird	<i>Philemon corniculatus</i>		2			1	2	2	5	4	2	5	2		1	X
Noisy Miner	<i>Manorina melanocephala</i>		4	3		2	2							2	2	X
Olive-backed Oriole	<i>Oriolus sagittatus</i>										1					X
Painted Button-quail	<i>Turnix varius</i>		2													
Painted Honeyeater	<i>Grantiella picta</i>	V									1					
Pallid Cuckoo	<i>Cacomantis pallidus</i>							1				1				
Peaceful Dove	<i>Geopelia striata</i>		3					3	2	2		2		2	4	X
Pied Butcherbird	<i>Cracticus nigrogularis</i>			1			1							1		X
Pied Currawong	<i>Strepera graculina</i>										2	2	1			X
Rainbow Bee-eater	<i>Merops ornatus</i>					1					1	1		1		
Red Wattlebird	<i>Anthochaera carunculata</i>													1		
Red-capped Robin	<i>Petroica goodenovii</i>			2							1	3	1			
Red-rumped Parrot	<i>Psephotus haematonotus</i>		6		4			4	2	4	7				2	X
Restless Flycatcher	<i>Myiagra inquieta</i>								1						2	
Rufous Songlark	<i>Cincloramphus mathewsi</i>		7	4	5	5	4	6	5	5				6	3	
Rufous Whistler	<i>Pachycephala rufiventris</i>		6	3	1	4	3		3	1	3	1	3	3	3	X
Sacred Kingfisher	<i>Todiramphus sanctus</i>															X
Shining Bronze-cuckoo	<i>Chalcites lucidus</i>								1		1	1				
Silvereye	<i>Zosterops lateralis</i>											2	3			
Singing Honeyeater	<i>Lichenostomus virescens</i>								1		2	2				
Southern Boobook	<i>Ninox novaeseelandiae</i>															X
Speckled Warbler	<i>Chthonicola sagittata</i>	V											1			
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>		1	2	2	2	1	2	2		1	2		2	1	
Spotted Pardalote	<i>Pardalotus punctatus</i>							1		1						
Striated Pardalote	<i>Pardalotus striatus</i>		2	1	3								1			
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>		1	1		1	1				2	1	1	1	1	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>										1					X
Superb Fairy-wren	<i>Malurus cyaneus</i>		4		3							1				X
Tawny Frogmouth	<i>Podargus strigoides</i>															X
Torresian Crow	<i>Corvus orru</i>		2													
Tree Martin	<i>Petrochelidon nigricans</i>		1													X
Turquoise Parrot	<i>Neophema pulchella</i>	V	2										1			
Wedge-tailed Eagle	<i>Aquila audax</i>						1	1				2		2		X
Weebill	<i>Smicrornis brevirostris</i>		2	1			2		1		1	4	4			
Welcome Swallow	<i>Hirundo neoxena</i>								3	2			1			X
Western Gerygone	<i>Gerygone fusca</i>		1		1	2	1								1	X
White-browed Scrubwren	<i>Sericornis frontalis</i>												2			
White-browed Woodswallow	<i>Artamus superciliosus</i>		20				20	15	50	40			5		15	
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>		4			2	2								1	
White-throated Gerygone	<i>Gerygone albogularis</i>												1			
White-throated Nightjar	<i>Eurostopodus mystacalis</i>															X
White-throated Treecreeper	<i>Cormobates leucophaea</i>		2						1	1	1	1	1		1	
White-winged Chough	<i>Corcorax melanorhamphos</i>						3		7			1				X
White-winged Fairy-wren	<i>Malurus leucopterus</i>															X
White-winged Triller	<i>Lalage sueurii</i>		5	4		4	2	5	4	6	3			3	3	X
Willie Wagtail	<i>Rhipidura leucophrys</i>		3	3	2	4	1	2	2	2	2			2	2	X
Yellow Thornbill	<i>Acanthiza nana</i>					2	3		2							
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>								1		1	1		1		
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>								1	1	2	2			1	
Zebra Finch	<i>Taeniopygia guttata</i>				6											
Nocturnal bird counts																
Australian Owlet Nightjar	<i>Aegotheles cristatus</i>				1			1	1	1			1	n/a		
Southern Boobook	<i>Ninox boobook</i>								1	1	1	1				
Tawny Frogmouth	<i>Podargus strigoides</i>				1						1					
White-throated Nightjar	<i>Eurostopodus mystacalis</i>									1		1				
Amphibian counts																

Common name	Scientific name	Status	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	TB1	TB2	O
Broad-palmed Frog	<i>Litoria latopalmata</i>		Call								Call			n/a		
Common Eastern Froglet	<i>Crinia signifera</i>										Call					
Green Tree Frog	<i>Litoria caerulea</i>		Call							Call		Call				
Northern Banjo Frog	<i>Limnodynastes terraereginae</i>				Call						Call	Call				
Peron's Tree Frog	<i>Litoria peronii</i>		Call		Call				2	Call	Call	Call				
Spotted Marsh Frog	<i>Limnodynastes tasmaniensis</i>				Call						Call					
Sudell's Frog	<i>Neobatrachus sudelli</i>				Call	1										
Reptile counts																
Boulenger's Morethia	<i>Morethia boulengeri</i>		1						1					n/a		
Common Dwarf Skink	<i>Menetia greyii</i>					1										
Common Thick-tailed Gecko	<i>Underwoodisaurus milii</i>				1			1								
Eastern Striped Skink	<i>Ctenotus robustus</i>											1				
Elegant Snake-Eyed Skink	<i>Cryptoblepharus pulcher</i>					1										
Leaden Delma	<i>Delma plebeia</i>								1							
Long-necked Turtle	<i>Chelodina longicollis</i>				1											
Nobbi Dragon	<i>Diporiphora nobbi</i>							2				1	1			
Tree Skink	<i>Egernia striolata</i>		3	1		1										
Mammal counts (excluding bats)																
Brushtail Possum	<i>Trichosurus vulpecula</i>		2						1					n/a		
Eastern Grey Kangaroo	<i>Macropus giganteus</i>								1				1			
European Hare	<i>Lepus europaeus</i>			1							2					
European Rabbit	<i>European rabbits</i>								1							
European Red Fox	<i>Vulpes vulpes</i>											1				
Feral Cat	<i>Felis catus</i>			1	1											
Swamp Wallaby	<i>Wallabia bicolor</i>								1							
Microbat calls (Definite)																
Chocolate Wattled Bat	<i>Chalinolobus morio</i>				2	1	3	2			-			n/a		
Eastern Bentwing Bat	<i>Miniopterus orianae</i>		3		5	12	52	14	5	3	-	1	17			
Chocolate Wattled Bat	<i>Rhinolophus megaphyllus</i>	V								13	-		2			
Eastern Bent-wing Bat	<i>Chalinolobus gouldii</i>		29	31	20	27	25	29	9	43	-	3	14			
Eastern Horseshoe Bat	<i>Chalinolobus dwyeri</i>	V							23		-					
Gould's Wattled Bat	<i>Scotorepens balstoni</i>				7	3	1				-	2				
Large-eared Pied Bat	<i>Scotorepens greyii</i>		7	1		5	4		1	8	-					
Little Broad-nosed Bat	<i>Vespadelus vulturnus</i>		19	4	5	13	41	85	8	87	-	11	96			
Little Broad-nosed Bat	<i>Ozimops ridei</i>		2		7	5	2		2		-	2				
Little Forest Bat	<i>Ozimops planiceps</i>			3	5	1	12		2	1	-	7				
Ride's Free-tailed Bat	<i>Austronomus australis</i>		2	3	3	3	6	1	3		-	4				
South-easterm Free-tailed Bat	<i>Saccolaimus flaviventris</i>		13		5	14	9	1	1	1	-	17	2			
White-striped Free-tailed Bat	<i>Chalinolobus morio</i>				2	1	3	2			-					
Yellow-bellied Sheath-tailed Bat	<i>Miniopterus orianae</i>	V	3		5	12	52	14	5	3	-	1	17			
Winter Targeted Bird Survey Results																
Apostlebird	<i>Struthidea cinerea</i>					8			6							
Australian Magpie	<i>Cracticus tibicen</i>		1	1		2		2	3	4		2	4	2	1	
Australian Raven	<i>Corvus coronoides</i>		7	2	4	2	7		3	3	1	2	1		2	
Australian Ringneck	<i>Barnardius zonarius</i>						1	1						1		
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>		1													
Brown Falcon	<i>Falco berigora</i>													1		
Brown Quail	<i>Coturnix ypsilophora</i>		3													
Brown Songlark	<i>Megalurus cruralis</i>									1						
Brown Treecreeper	<i>Climacteris picumnus</i>	V	1													
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>		3						5	4				2	1	
Common Bronzewing	<i>Phaps chalcoptera</i>			2		1			1			4		1		
Crested Pigeon	<i>Ocyphaps lophotes</i>		1			2	3		4	1						
Eastern Rosella	<i>Platycercus eximius</i>		2				1	1	1							
Eastern Yellow Robin	<i>Eopsaltria australis</i>			2		1	4								1	
Galah	<i>Eolophus roseicapillus</i>		3	2			1		3	2				4		

Common name	Scientific name	Status	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	TB1	TB2	O
Golden Whistler	<i>Pachycephala pectoralis</i>						8					1				
Grey Butcherbird	<i>Cracticus torquatus</i>						1								1	
Grey Shrike-thrush	<i>Colluricincla harmonica</i>		1	1												
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	V							7			8				
Hooded Robin	<i>Melanodryas cucullata</i>									2	1					
Jacky Winter	<i>Microeca fascinans</i>		1					2								
Laughing Kookaburra	<i>Dacelo novaeguineae</i>			1	1				1	1		1		2		
Magpie-lark	<i>Grallina cyanoleuca</i>		1			2			3	2			1	2	2	
Nankeen Kestrel	<i>Falco cenchroides</i>										1					
Noisy Friarbird	<i>Philemon corniculatus</i>		1						1							
Noisy Miner	<i>Manorina melanocephala</i>		2						1	1	1	2		2	5	
Pied Butcherbird	<i>Cracticus nigrogularis</i>			1			11					1				
Pied Currawong	<i>Strepera graculina</i>				1				3			1	2		1	
Red-capped Robin	<i>Petroica goodenovii</i>											2				
Red-rumped Parrot	<i>Psephotus haematonotus</i>		2		1			3	20			3		2	3	
Rufous Whistler	<i>Pachycephala rufiventris</i>				1		2									
Speckled Warbler	<i>Chthonicola sagittata</i>	V		4					3							
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>		1													
Striated Pardalote	<i>Pardalotus striatus</i>				2			2	1			1			2	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>			2												
Superb Fairy-wren	<i>Malurus cyaneus</i>			2								3				
Tawny Frogmouth	<i>Podargus strigoides</i>						4		1							
Tree Martin	<i>Petrochelidon nigricans</i>														1	
Wedge-tailed Eagle	<i>Aquila audax</i>					1										
Weebill	<i>Smicrornis brevirostris</i>				3			2						4	4	
Western Gerygone	<i>Gerygone fusca</i>		1	2	1										1	
White-eared Honeyeater	<i>Lichenostomus leucotis</i>			1										1		
White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>		2						7	2					2	
White-throated Treecreeper	<i>Cormobates leucophaea</i>			1	1				1						2	
Willie Wagtail	<i>Rhipidura leucophrys</i>			1		2		1	1	1	1				2	
Yellow Thornbill	<i>Acanthiza nana</i>			7	2	9		3	12					4	4	
Yellow-faced Honeyeater	<i>Lichenostomus chrysops</i>						6					1				
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>								7			7		5	3	
V= Vulnerable under the BC Act																

Table C2 Fauna Species List Mine BOA

Common name	Scientific name	Status	S12	S13	S14	S15	S16	S17	S18	S19	TB3	O
Diurnal bird counts												
Apostlebird	<i>Struthidea cinerea</i>		6	4		8	4	1				
Australian Hobby	<i>Falco longipennis</i>		1									
Australian King-parrot	<i>Alisterus scapularis</i>		2									
Australian Magpie	<i>Cracticus tibicen</i>		6	4	1	2	4	1		1		1
Australian Raven	<i>Corvus coronoides</i>		4	3		4	4	1		2	1	
Australian Ringneck	<i>Barnardius zonarius</i>					2			4		2	
Bar-shouldered Dove	<i>Geopelia humeralis</i>				2	1		1	2		1	
Black-eared Cuckoo	<i>Chalcites osculans</i>				1						1	
Black-faced Cuckoo-shrike	<i>Coracina novaehollandiae</i>	Marine - EPBC Act		1		1		2		1		
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>					2					6	
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>			2		3	3	1	1	3		
Channel-billed Cuckoo	<i>Scythrops novaehollandiae</i>					1		1				
Common Bronzewing	<i>Phaps chalcoptera</i>				2	4		1	1		2	
Common Starling	<i>Sturnus vulgaris</i>	Feral				4						
Crested Pigeon	<i>Ocyphaps lophotes</i>		6	2	1	4	2	1		2	1	
Double-barred Finch	<i>Taeniopygia bichenovii</i>		4									
Eastern Koel	<i>Eudynamys orientalis</i>					1						
Eastern Rosella	<i>Platycercus eximius</i>		2	2		2	1			2	2	
Eastern Yellow Robin	<i>Eopsaltria australis</i>		1		1		1	1			2	
Emu	<i>Dromaius novaehollandiae</i>										3	1
Fan-tailed Cuckoo	<i>Cacomantis flabelliformis</i>				1						1	
Galah	<i>Eolophus roseicapillus</i>		6	4	2	3		2		2	4	
Golden Whistler	<i>Pachycephala pectoralis</i>										2	
Grey Butcherbird	<i>Cracticus torquatus</i>			2			2			4	1	
Grey Fantail	<i>Rhipidura albiscapa</i>				2			2	2	1	2	
Grey Shrike-thrush	<i>Colluricincla harmonica</i>		1		1			1	2	2	1	
Grey Teal	<i>Anas gracilis</i>			2								
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	Vulnerable - BC Act				6				2		
Inland Thornbill	<i>Acanthiza apicalis</i>				3			1	1		2	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>				1	3	2				1	
Leaden Flycatcher	<i>Myiagra rubecula</i>		1							1		
Little Friarbird	<i>Philemon citreogularis</i>					1		1				
Magpie-lark	<i>Grallina cyanoleuca</i>		8	3		4	1					
Mistletoebird	<i>Dicaeum hirundinaceum</i>						1					
Noisy Friarbird	<i>Philemon corniculatus</i>		1	1	1	2	3		1	4	4	
Noisy Miner	<i>Manorina melanocephala</i>	Key Threatening Process - BC Act	8	6		6	2	1	1	4		
Olive-backed oriole	<i>Oriolus sagittatus</i>							1				
Pallid Cuckoo	<i>Cacomantis pallidus</i>					1			1	1		
Peaceful Dove	<i>Geopelia striata</i>		1							2		
Pied Butcherbird	<i>Cracticus nigrogularis</i>		5	2	1	4						
Pied Currawong	<i>Strepera graculina</i>		1		1		1	2	3		1	
Rainbow Bee-eater	<i>Merops ornatus</i>	Marine, Migratory - EPBC Act				1		1		1		
Red-capped Robin	<i>Petroica goodenovii</i>							1				
Rufous Songlark	<i>Cincloramphus mathewsi</i>		6									
Rufous Whistler	<i>Pachycephala rufiventris</i>					2		3	3	2	2	
Sacred Kingfisher	<i>Todiramphus sanctus</i>		1									
Shining Bronze-cuckoo	<i>Chalcites lucidus</i>								1	1		
Speckled Warbler	<i>Chthonicola sagittata</i>	Vulnerable - BC Act							2		2	
Spiny-cheeked Honeyeater	<i>Acanthagenys rufogularis</i>		1			2	1		1	1		
Striated Pardalote	<i>Pardalotus striatus</i>					2					1	

Common name	Scientific name	Status	S12	S13	S14	S15	S16	S17	S18	S19	TB3	O
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>						2				2	
Sulphur-crested Cockatoo	<i>Cacatua galerita</i>		1	1						1	1	
Superb Fairy-wren	<i>Malurus cyaneus</i>		2									
Torresian Crow	<i>Corvus orru</i>											2
Variegated Fairy-wren	<i>Malurus lamberti</i>						3					
Weebill	<i>Smicrornis brevirostris</i>									5		
Welcome Swallow	<i>Hirundo neoxena</i>			5								
Western Gerygone	<i>Gerygone fusca</i>				1	1	1	1		1	1	
White-eared Honeyeater	<i>Lichenostomus leucotis</i>				1						1	
White-throated Gerygone	<i>Gerygone albogularis</i>					2						
White-throated Needletail	<i>Hirundapus caudacutus</i>	Marine, Migratory - EPBC Act	9		7							
White-throated Treecreeper	<i>Cormobates leucophaea</i>				1					2		
White-winged Chough	<i>Corcorax melanoramphos</i>			6				6		5		2
White-winged Triller	<i>Lalage sueurii</i>							1				
Willie Wagtail	<i>Rhipidura leucophrys</i>		1	1		2	1			2		1
Yellow thornbill	<i>Acanthiza nana</i>					6						
Yellow-rumped Thornbill	<i>Acanthiza chrysorrhoa</i>			1								
Nocturnal bird counts												
Tawny Frogmouth	<i>Podargus strigoides</i>										1	
Microbat call activity												
White-striped Free-tailed Bat	<i>Austronomus australis</i>		3	16	2	2	5		2		n/a	n/a
Gould's Wattled Bat	<i>Chalinolobus gouldii</i>		4	35	8		1		386		n/a	n/a
Chocolate Wattled Bat	<i>Chalinolobus morio</i>		3	63	4		1			1	n/a	n/a
Eastern Bent-winged Bat	<i>Miniopterus schreibersii oceanensis</i>	Vulnerable - BC Act	2	24	1		3		3		n/a	n/a
Inland Free-tailed Bat	<i>Ozimops petersi</i>		72	4	67	13	21	1	51	6	n/a	n/a
Southern Free-tailed Bat	<i>Ozimops planiceps</i>		212	29	143	119	33		10	2	n/a	n/a
Yellow-bellied Sheath-tailed Bat	<i>Saccolaimus flaviventris</i>	Vulnerable - BC Act	30	1	31	12	9		1		n/a	n/a
Inland Broad-nosed Bat	<i>Scotorepens balstoni</i>		5	18	3		2		38		n/a	n/a
Little Broad-nosed Bat	<i>Scotorepens greyii</i>		14	37	31		6	1	74	1	n/a	n/a
Eastern Cave Bat	<i>Vespadelus trougtoni</i>	Vulnerable - BC Act	1	2	2		4			1	n/a	n/a
Little Forest Bat	<i>Vespadelus vulturnus</i>		19	65	24		20		17	2	n/a	n/a
Mammals (excluding microbats)												
European Red Fox	<i>Vulpes vulpes</i>	Feral			1							
Swamp Wallaby	<i>Wallabia bicolor</i>									1		
Feral Cat	<i>Felis catus</i>	Feral				1						
Reptile counts												
Burton's Legless Lizard	<i>Lialis burtonis</i>								1			
Common Dwarf Skink	<i>Menetia greyii</i>							1				
Eastern Bearded Dragon	<i>Pogona barbata</i>					1						
Lace Monitor	<i>Varanus varius</i>									1		2
Nobbi Dragon	<i>Diporiphora nobbi</i>				1		2	2				
Ragged Snake-eyed Skink	<i>Cryptoblepharus pannosus</i>							1				
Sand Goanna	<i>Varanus gouldii</i>											1
Winter bird survey results												
Australian Magpie	<i>Cracticus tibicen</i>		2	2		2	1			1	1	
Australian Raven	<i>Corvus coronoides</i>		2	2	1	5	3	2	1	2		
Australian Ringneck	<i>Barnardius zonarius</i>					6				1		
Bar-shouldered Dove	<i>Geopelia humeralis</i>									1		
Blue Bonnet	<i>Northiella haematogaster</i>			2								
Brown Goshawk	<i>Accipiter fasciatus</i>					1						
Brown-headed Honeyeater	<i>Melithreptus brevirostris</i>						4					
Buff-rumped Thornbill	<i>Acanthiza reguloides</i>					2	5			2		

Common name	Scientific name	Status	S12	S13	S14	S15	S16	S17	S18	S19	TB3	O
Common Bronzewing	<i>Phaps chalcoptera</i>		2									
Crested Pigeon	<i>Ocyphaps lophotes</i>		2	2								
Double-barred Finch	<i>Taeniopygia bichenovii</i>		6									
Eastern Rosella	<i>Platycercus eximius</i>			2		2	2					
Eastern Yellow Robin	<i>Eopsaltria australis</i>				1			2	1	1	2	
Galah	<i>Eolophus roseicapillus</i>		2	2		2	4					
Golden Whistler	<i>Pachycephala pectoralis</i>					1					1	
Grey Butcherbird	<i>Cracticus torquatus</i>			1			1		1			
Grey Fantail	<i>Rhipidura albiscapa</i>					1	1					
Grey Shrike-thrush	<i>Colluricincla harmonica</i>					2	2	1	1	1	1	
Grey-crowned Babbler	<i>Pomatostomus temporalis</i>	Vulnerable - BC Act	7	5		5	2					
Inland Thornbill	<i>Acanthiza apicalis</i>				2	4	1	2		2	2	
Laughing Kookaburra	<i>Dacelo novaeguineae</i>										2	
Little Pied Cormorant	<i>Microcarbo melanoleucos</i>			1								
Magpie-lark	<i>Grallina cyanoleuca</i>		2	2		2						
Mistletoebird	<i>Dicaeum hirundinaceum</i>						1					
Noisy Miner	<i>Manorina melanocephala</i>	Key Threatening Process - BC Act	8	8		1	3	1	1	1		
Olive-backed Oriole	<i>Oriolus sagittatus</i>			3								
Pied Butcherbird	<i>Cracticus nigrogularis</i>		2	1		1	1	1				
Pied Currawong	<i>Strepera graculina</i>		2	1	1		1		1		3	
Red-rumped Parrot	<i>Psephotus haematonotus</i>		4	8								
Singing Honeyeater	<i>Lichenostomus virescens</i>							1		1		
Speckled Warbler	<i>Chthonicola sagittata</i>	Vulnerable - BC Act					1	2				
Striated Pardalote	<i>Pardalotus striatus</i>		1									
Striped Honeyeater	<i>Plectorhyncha lanceolata</i>					1		1	1	1		
Tree Martin	<i>Petrochelidon nigricans</i>		3									
Variegated Fairy-wren	<i>Malurus lamberti</i>				2							
Weebill	<i>Smicrornis brevirostris</i>						2	2		2		
White-eared Honeyeater	<i>Lichenostomus leucotis</i>							2				
White-throated Treecreeper	<i>Cormobates leucophaea</i>					1	1			1	1	
White-winged Chough	<i>Corcorax melanoramphos</i>			24								
Willie Wagtail	<i>Rhipidura leucophrys</i>			1		1						
Yellow Thornbill	<i>Acanthiza nana</i>		4			4	4	4	2			

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 ($\mu\text{S}/\text{cm}$)	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	

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
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	
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	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1202508-001	KC2DS	1 February 2012	7.58	143	52	<5	11	
ES1202508-002	KCD5	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	KCD5	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	
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	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1302189-001	KCD5	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	KCD5	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	
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	KCD5	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	

Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

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
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	
ES1613581-001	PC	20 June 2016	7.05	50	192	<5	8	
ES1613978-001	KC2DS	24 June 2016	6.85	49	12	<5	16	
ES1613978-002	KC2US	24 June 2016	6.87	50	82	<5	13	
ES1613978-003	KCUS	24 June 2016	7.28	70	92	<5	10	
ES1613978-004	PC1	24 June 2016	7.52	105	28	<5	1	
ES1613978-005	PC	24 June 2016	6.88	57	150	<5	6	
ES1613978-006	KC1DS	24 June 2016	7.55	160	63	<5	2	
ES1614765-001	KC2US	5 July 2016	6.49	36	128	<5	12	
ES1614765-002	KCUS	5 July 2016	6.64	47	134	8	12	
ES1614765-003	PC	5 July 2016	6.57	76	133	8	10	
ES1614765-004	KC1DS	5 July 2016	7.13	171	22	5	10	
ES1614765-005	KC2DS	5 July 2016	6.6	77	20	<5	23	

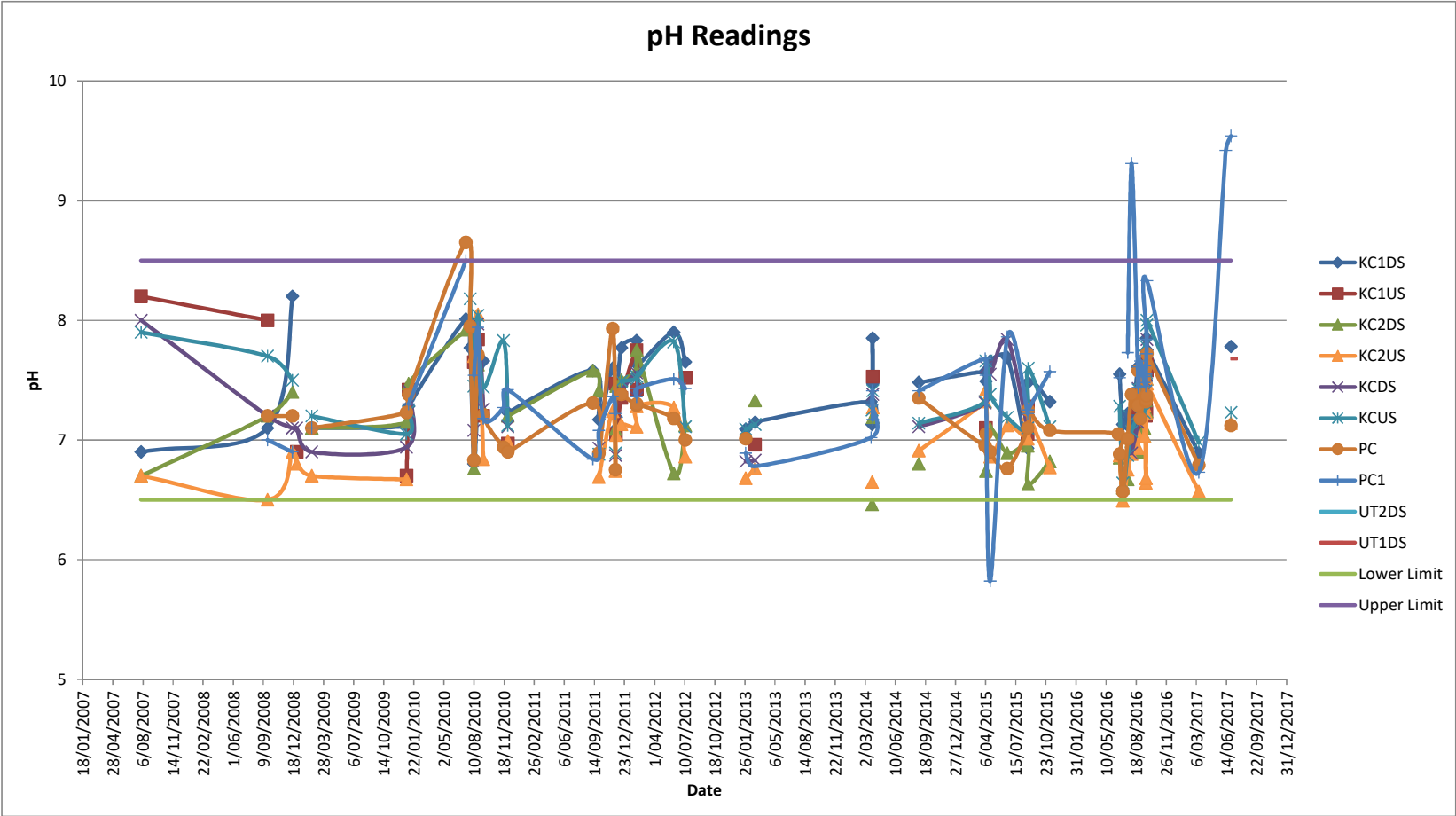
Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1616264-001	KC2DS	21 July 2016	6.67	57	20	<5	27	
ES1616264-002	KC2US	21 July 2016	6.75	54	39	12	19	
ES1616264-003	KCUS	21 July 2016	6.87	52	120	9	14	
ES1616264-004	PC1	21 July 2016	7.73	196	60	<5	16	
ES1616264-005	PC	21 July 2016	7.01	72	92	<5	13	
ES1616264-006	KC1DS	21 July 2016	7.22	124	52	<5	19	
ES1617224-001	KC2DS	3 August 2016	6.99	85	16	<5	24	
ES1617224-002	KC2US	3 August 2016	6.88	38	69	<5	10	
ES1617224-003	KCUS	3 August 2016	7.07	57	884	<5	7	
ES1617224-004	PC1	3 August 2016	9.31	533	361	<5	13	
ES1617224-005	PC	3 August 2016	7.38	70	158	<5	7	
ES1617224-006	KC1DS	3 August 2016	7.09	96	73	<5	12	
ES1617224-007	KCDS	3 August 2016	6.89	59	408	<5	6	
ES1618767-001	KC2DS	23 August 2016	6.92	51	17	<5	24	
ES1618767-002	KCDS	23 August 2016	7.15	239	20	<5	12	
ES1618767-003	KC2US	23 August 2016	7.05	48	14	<5	14	
ES1618767-004	KCUS	23 August 2016	7.22	454	28	<5	12	
ES1618767-005	KC1US	23 August 2016	7.27	88	24	<5	11	
ES1618767-006	PC1	23 August 2016	7.61	132	35	<5	10	
ES1618767-007	PC	23 August 2016	7.29	151	35	<5	14	
ES1618767-008	KC1DS	23 August 2016	7.61	183	31	<5	13	
ES1619011-001	KC2DS	25 August 2016	6.9	70	25	<5	23	
ES1619011-002	KCDS	25 August 2016	7.43	166	43	<5	17	
ES1619011-003	KC2US	25 August 2016	6.93	56	20	<5	10	
ES1619011-004	KCUS	25 August 2016	7.42	189	44	5	13	
ES1619011-005	KC1US	25 August 2016	7.06	87	21	<5	13	
ES1619011-006	PC1	25 August 2016	7.44	105	83	<5	10	
ES1619011-007	PC	25 August 2016	7.58	147	12	<5	14	
ES1619011-008	KC1DS	25 August 2016	7.57	127	38	<5	15	
ES1619492-001	KCUS	1 September 2016	7.51	458	22	<5	7	
ES1619492-002	PC1	1 September 2016	7.66	224	74	<5	<1	
ES1619492-003	PC	1 September 2016	7.18	161	16	<5	8	
ES1619492-004	KC1DS	1 September 2016	7.47	334	6	<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
ES1620622-001	KC2DS	14 September 2016	7.1	52	16	<5	16	
ES1620622-002	KCDS	14 September 2016	7.39	125	181	7	12	
ES1620622-003	KC2US	14 September 2016	7.03	40	26	6	9	
ES1620622-004	KCUS	14 September 2016	7.23	93	209	<5	9	
ES1620622-005	KC1US	14 September 2016	7.27	92	62	7	12	
ES1620622-006	PC1	14 September 2016	7.48	98	196	<5	11	
ES1620622-007	PC	14 September 2016	7.51	110	23	6	12	
ES1620622-008	KC1DS	14 September 2016	7.47	114	115	<5	13	
ES1620748-001	KC2DS	15 September 2016	7.03	71	<5	<5	17	
ES1620748-002	KCDS	15 September 2016	7.5	146	54	<5	9	
ES1620748-003	KC2US	15 September 2016	7.29	56	11	<5	12	
ES1620748-004	KCUS	15 September 2016	7.57	155	69	<5	13	
ES1620748-005	KC1US	15 September 2016	7.41	124	34	<5	15	
ES1620748-006	PC1	15 September 2016	7.53	85	72	<5	10	
ES1620748-007	PC	15 September 2016	7.57	109	15	<5	11	
ES1620748-008	KC1DS	15 September 2016	7.45	147	34	<5	14	
ES1620748-009	SD2	15 September 2016	7.61	152	11	<5	13	
ES1620748-010	SD5	15 September 2016	7.69	155	5	<5	15	
ES1620986-001	KC2DS	16 September 2016	7.46	160	<5	<5	14	
ES1620986-002	KCDS	16 September 2016	7.58	340	6	<5	9	
ES1620986-003	KC2US	16 September 2016	7.37	77	<5	<5	14	
ES1620986-004	KCUS	16 September 2016	7.79	591	16	<5	10	
ES1620986-005	KC1US	16 September 2016	7.4	154	37	<5	11	
ES1620986-006	PC1	16 September 2016	7.62	99	35	<5	11	
ES1620986-007	PC	16 September 2016	7.59	126	17	<5	10	
ES1620986-008	KC1DS	16 September 2016	7.64	287	13	<5	7	
ES1620986-009	SD2	16 September 2016	7.44	183	12	<5	13	
ES1620986-010	SD5	16 September 2016	7.76	167	<5	<5	12	
ES1621113-001	SD5	19 September 2016	7.66	174	8	<5	12	
ES1621113-002	SD2	19 September 2016	7.46	170	<5	<5	11	
ES1621113-003	KC2DS	19 September 2016	7.33	164	191	<5	14	
ES1621113-004	KCDS	19 September 2016	7.55	406	10	<5	11	
ES1621113-005	KC2US	19 September 2016	6.64	82	<5	<5	12	
ES1621113-006	KCUS	19 September 2016	7.41	465	11	<5	11	
ES1621113-007	KC1US	19 September 2016	7.2	173	60	<5	12	
ES1621113-008	PC1	19 September 2016	7.45	108	45	<5	11	
ES1621113-009	PC	19 September 2016	7.32	120	<5	<5	6	
ES1621113-010	KC1DS	19 September 2016	7.49	250	20	<5	12	

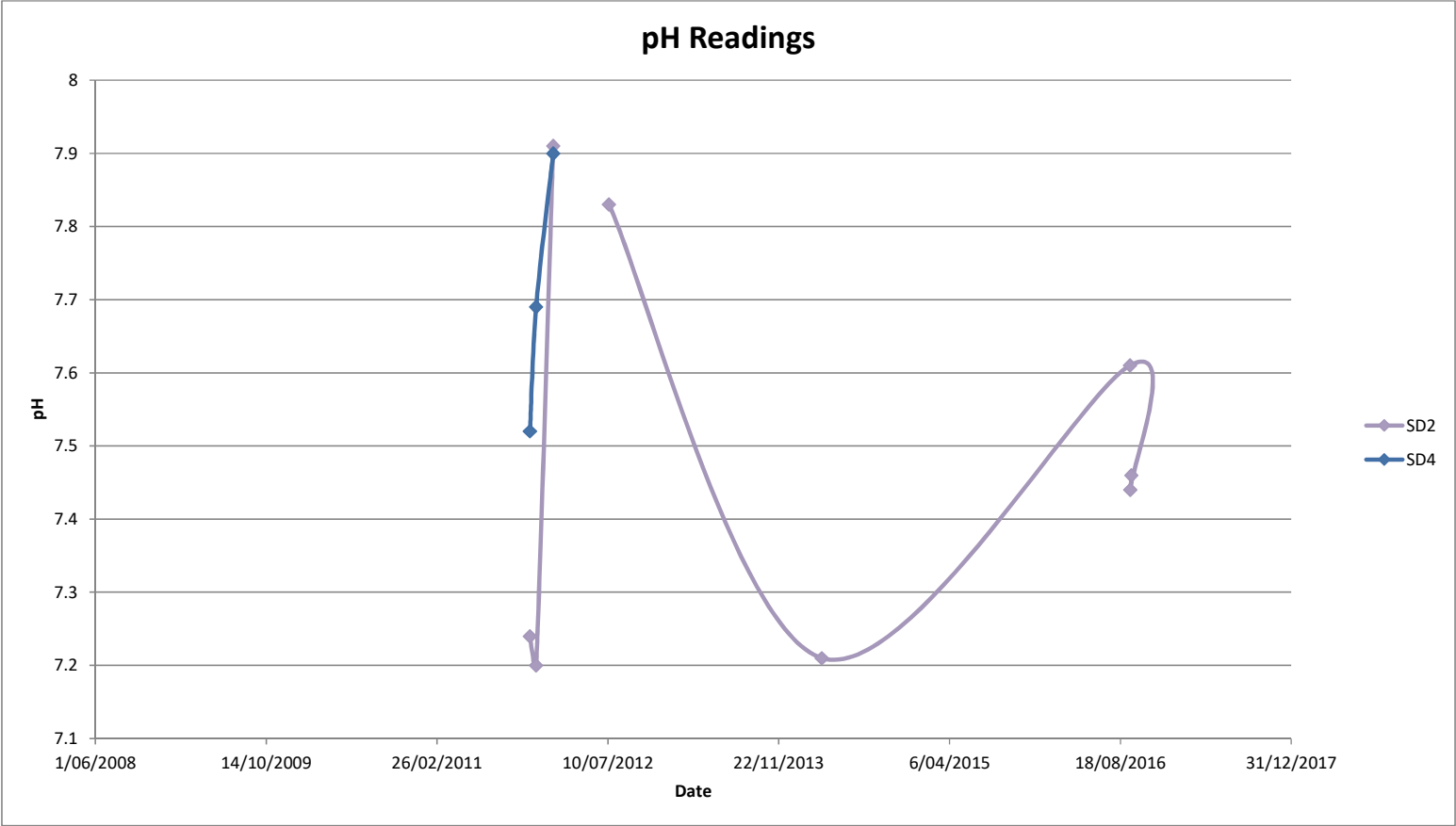
Sample No.	Sample Location	Date	pH	Electrical Conductivity ($\mu\text{S}/\text{cm}$)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1621114-001	KC2DS	20 September 2016	7.36	163	<5	<5	12	
ES1621114-002	SD5	20 September 2016	7.05	126	<5	<5	14	
ES1621114-003	KCDS	20 September 2016	7.54	471	7	<5	9	
ES1621114-004	KC2US	20 September 2016	6.68	82	<5	<5	11	
ES1621114-005	KCUS	20 September 2016	7.58	764	8	<5	9	
ES1621114-006	KC1US	20 September 2016	7.26	195	15	<5	11	
ES1621114-007	PC1	20 September 2016	7.55	109	33	<5	11	
ES1621114-008	PC	20 September 2016	7.33	124	6	<5	10	
ES1621114-009	KC1DS	20 September 2016	7.5	345	12	<5	10	
ES1621235-001	SD5	21 September 2016	7.11	118	21	<5	14	
ES1621235-002	KC2DS	21 September 2016	7.24	165	15	<5	13	
ES1621235-003	KCDS	21 September 2016	7.67	587	12	<5	8	
ES1621235-004	KC2US	21 September 2016	7.22	106	7	<5	12	
ES1621235-005	KCUS	21 September 2016	7.56	435	16	<5	10	
ES1621235-006	KC1US	21 September 2016	7.23	215	10	<5	11	
ES1621235-007	PC1	21 September 2016	7.72	146	94	<5	12	
ES1621235-008	PC	21 September 2016	7.37	145	14	<5	9	
ES1621235-009	KC1DS	21 September 2016	7.85	1100	11	<5	8	
ES1621367-001	KC2DS	22 September 2016	7.51	172	6	<5	12	
ES1621367-002	SD5	22 September 2016	7.21	126	9	<5	16	
ES1621367-003	KCDS	22 September 2016	7.69	810	8	<5	8	
ES1621367-004	KC2US	22 September 2016	7.51	119	<5	<5	11	
ES1621367-005	KCUS	22 September 2016	7.96	1220	<5	<5	8	
ES1621367-006	KC1US	22 September 2016	7.58	210	18	<5	11	
ES1621367-007	PC1	22 September 2016	7.84	107	18	<5	11	
ES1621367-008	PC	22 September 2016	7.62	140	9	<5	10	
ES1621367-009	KC1DS	22 September 2016	7.68	626	9	<5	9	
ES1621611-001	SD5	23 September 2016	7.21	125	10	<5	18	
ES1621611-002	KC2DS	23 September 2016	7.39	169	10	<5	14	
ES1621611-003	KCDS	23 September 2016	7.84	921	12	<5	9	
ES1621611-004	KC2US	23 September 2016	7.47	131	<5	<5	12	
ES1621611-005	KCUS	23 September 2016	8	1280	<5	<5	8	
ES1621611-006	KC1US	23 September 2016	7.63	255	10	<5	11	
ES1621611-007	PC1	23 September 2016	8.33	117	30	<5	13	
ES1621611-008	PC	23 September 2016	7.72	148	10	<5	10	
ES1621611-009	KC1DS	23 September 2016	7.75	580	6	<5	9	

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
ES1706251-001	KC2US	14 March 2017	6.57	78	37	<5	17	
ES1706251-002	KCUS	14 March 2017	6.98	294	2180	<5	15	
ES1706251-003	PC1	14 March 2017	6.73	55	1210	<5	17	
ES1706251-004	PC	14 March 2017	6.79	77	626	<5	14	
ES1706251-005	KC1DS	14 March 2017	6.89	107	189	<5	15	
ES1714527-001	PC1	12 June 2017	9.42	697	152	<5	20	
ES1716242-001	KC2US	29 June 2017	7.14	70	40	<5	28	
ES1716242-002	KCUS	29 June 2017	7.23	82	222	<5	14	
ES1716242-003	KC1DS	29 June 2017	7.78	180	103	<5	20	
ES1716242-004	PC	29 June 2017	7.12	58	144	<5	10	
ES1716242-005	PC1	29 June 2017	9.54	897	225	<5	28	
ES1716242-006	UT1DS	29 June 2017	7.68	148	20	<5	10	
ES1716242-007	UT2DS	29 June 2017	7.1	54	124	<5	15	

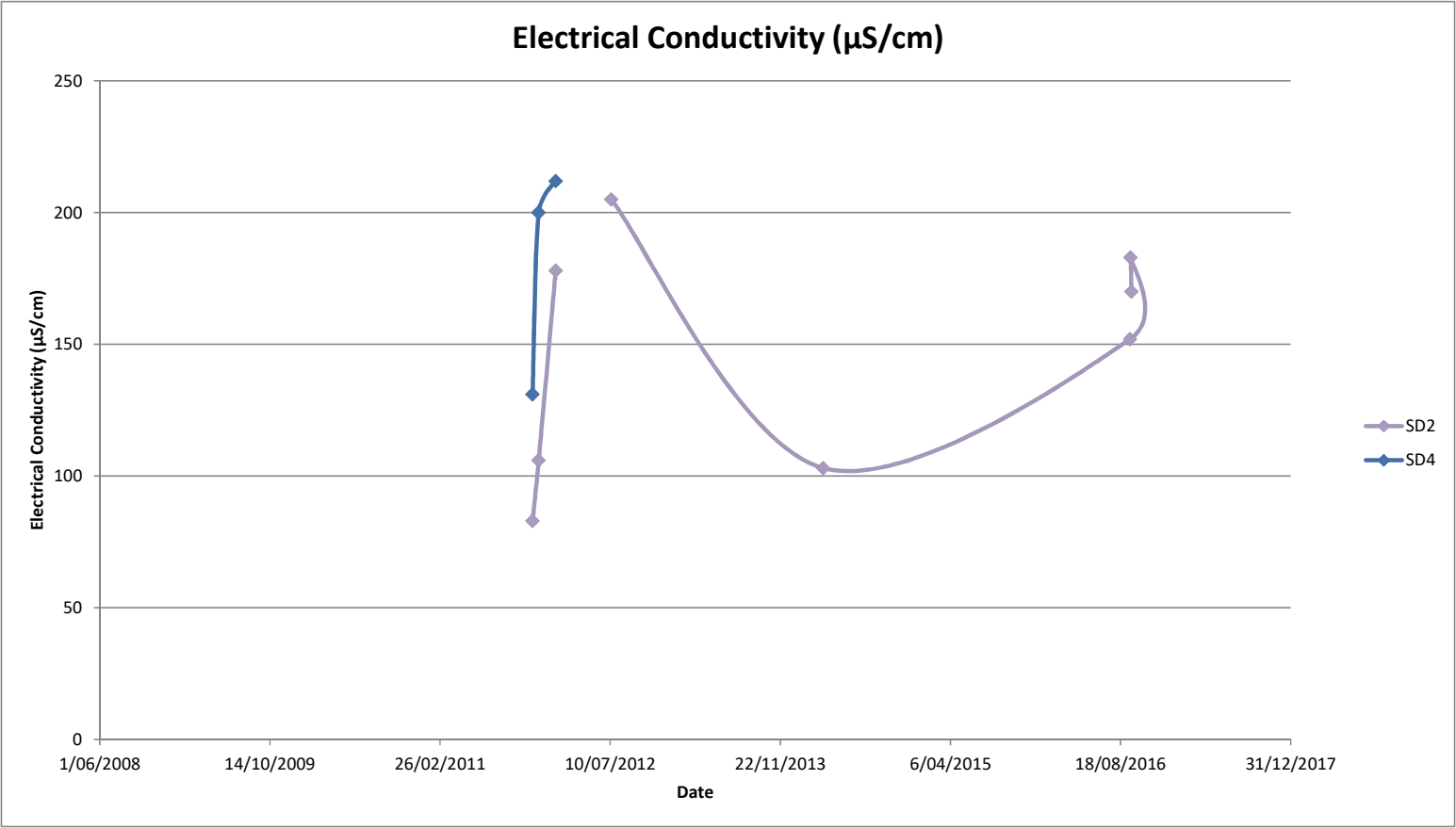
Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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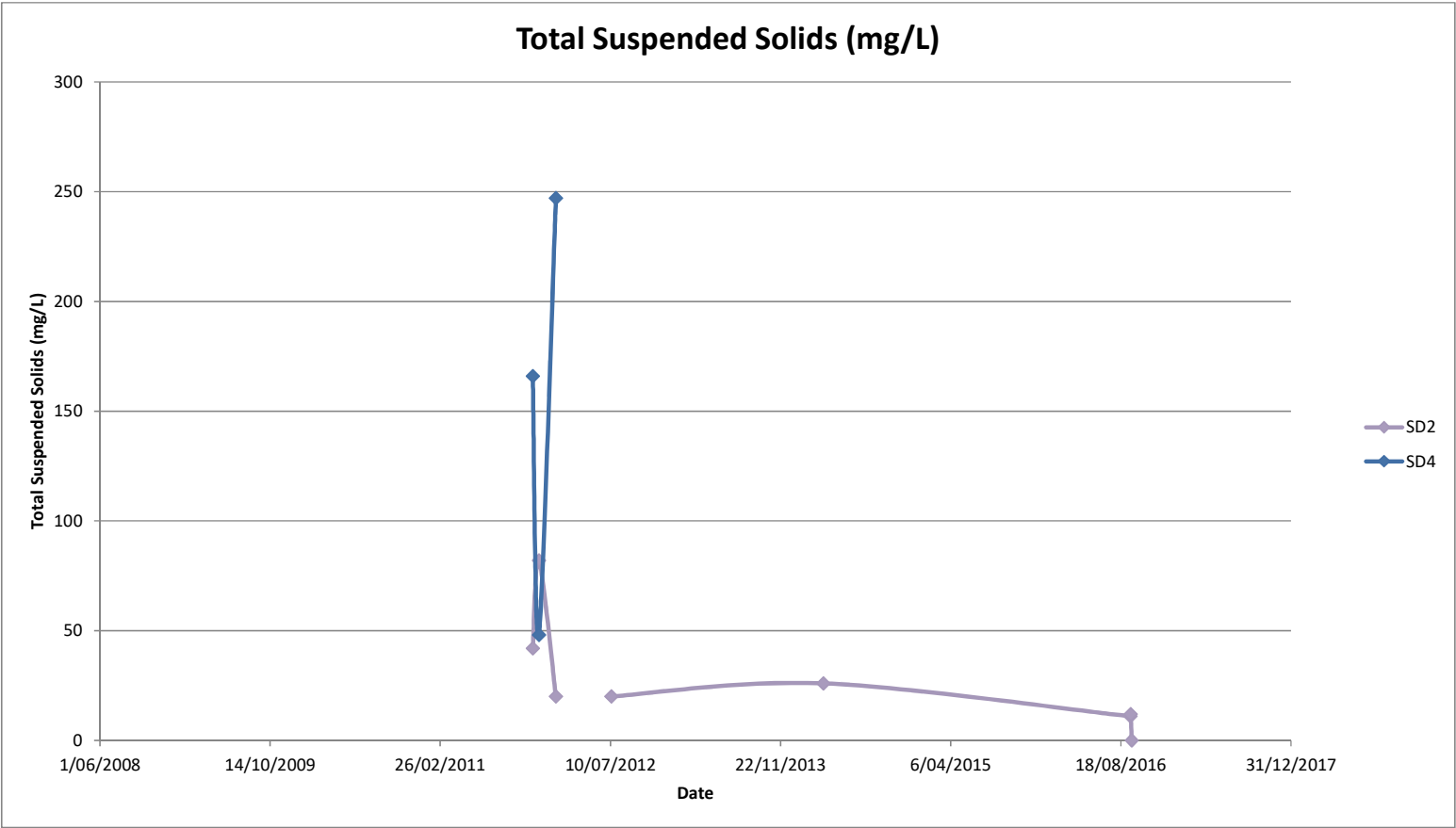
Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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Sample No.	Sample Location	Date	pH	Electrical Conductivity (µS/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	
ES1025816-004	13 December 2010	A1	9.25	1280	25	<5	9	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1025816-005	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
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

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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 (µS/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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
	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	
-	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	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
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	
ES1607989-001	12 April 2016	A1	9.17	8300	<5	<5	14	
ES1607989-002	12 April 2016	A2	8.99	7870	68	<5	364	
ES1607989-003	12 April 2016	A3	8.9	7560	163	<5	393	
ES1607989-004	12 April 2016	B1	8.66	695	<5	<5	9	
-	12 April 2016	B2	-	-	-	-	-	Dry
ES1607989-005	12 April 2016	C	9.68	26900	103	11	12	High EC
ES1607989-006	12 April 2016	D	8.41	834	21	17	1	
-	13 April 2016	SB1	-	-	-	-	-	Dry
ES1608080-001	13 April 2016	SB2	9.48	5910	36	59	29	
-	13 April 2016	SB3	-	-	-	-	-	Dry
ES1608080-002	13 April 2016	SD1	8.78	589	26	98	20	
ES1608080-003	13 April 2016	SD2	8.88	456	28	76	11	
ES1607993-001	12 April 2016	SD3	8.69	650	28	<5	17	
-	13 April 2016	SD4	-	-	-	-	-	Dry
ES1608080-004	13 April 2016	SD5	8.66	402	27	<5	12	
ES1608080-005	13 April 2016	SD6	9.15	1940	19	37	34	
ES1607993-003	12 April 2016	BOX CUT	8.59	6280	518	<10	460	
ES1611129-001	23 May 2016	SD6	9.22	2080	23	<5	36	
ES1611129-002	23 May 2016	BOX CUT	8.9	8690	1930	<5	217	
ES1611233-001	24 May 2016	SB1	9.2	11400	12	<5	177	
ES1611233-002	24 May 2016	SB2	9.52	5910	40	<5	43	
-	24 May 2016	SB3	-	-	-	-	-	Dry
ES1611233-003	24 May 2016	SD1	8.6	622	233	<5	25	
ES1611233-004	24 May 2016	SD2	9.5	451	25	<5	15	
ES1611233-005	24 May 2016	SD3	8.69	722	20	<5	16	
-	24 May 2016	SD4	-	-	-	-	-	Dry
ES1611233-006	24 May 2016	SD5	9.1	405	16	<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
ES1611332-001	25 May 2016	A1	9.22	7380	8	<5	4	
ES1611332-002	25 May 2016	A2	9.04	8450	12	<5	<1	
ES1611332-003	25 May 2016	A3	8.87	8910	22	<5	6	
ES1611332-004	25 May 2016	B1	8.64	604	<5	<5	<1	
-	25 May 2016	B2	-	-	-	-	-	Under construction
ES1611332-005	25 May 2016	C	9.89	27400	34	8	4	
ES1611332-006	25 May 2016	D	8.4	846	25	<5	3	
ES1613724-001	22 June 2016	A1	9.1	7730	7	<5	4	
ES1613724-002	22 June 2016	A2	9.4	8860	66	<5	6	
ES1613724-003	22 June 2016	A3	8.85	9380	12	<5	5	
ES1613724-004	22 June 2016	B1	8.69	577	22	<5	38	
	22 June 2016	B2	-	-	-	-	-	Under construction
ES1613724-005	22 June 2016	C	9.79	25700	45	6	581	
ES1613724-006	22 June 2016	D	8.59	795	12	<5	61	
ES1613734-003	22 June 2016	BOX CUT	8.85	8170	141	6	9	
ES1613766-001	23 June 2016	SB1	8.93	10600	67	7	698	
ES1613766-002	23 June 2016	SB2	9.48	4240	51	<5	30	
ES1613766-003	23 June 2016	SB3	8.98	2020	36	<5	13	
ES1613766-004	23 June 2016	SD1	8.06	412	23	<5	18	
ES1613766-005	23 June 2016	SD2	7.94	313	26	<5	10	
ES1613766-006	23 June 2016	SD3	8.55	574	15	<5	17	
ES1613766-007	23 June 2016	SD4	8.16	1130	24	10	9	
ES1613766-008	23 June 2016	SD5	7.11	82	72	<5	15	
ES1613766-009	23 June 2016	SD6	9.07	1760	62	<5	23	
ES1616076-001	21 July 2016	SB1	9.18	7960	176	19	136	
ES1616076-002	21 July 2016	SB2	9.2	1190	203	<5	38	
ES1616079-001	21 July 2016	A1	9.02	7910	26	<5	46	
ES1616079-002	21 July 2016	A2	8.93	7900	94	<5	8	
ES1616079-003	21 July 2016	A3	8.94	7440	130	<5	18	
ES1616079-004	21 July 2016	B1	8.48	522	8	<5	2	
	21 July 2016	B2	-	-	-	-	-	Under construction
ES1616079-005	21 July 2016	C	9.78	25400	72	<5	2100	
ES1616079-006	21 July 2016	D	8.31	745	7	<5	3	
ES1616331-001	25 July 2016	SD6	8.97	1340	151	<5	20	
ES1616331-002	25 July 2016	BOX CUT	8.54	9570	2710	<5	21	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1616390-001	26 July 2016	SB3	9.38	3560	10	<5	17	
ES1616390-002	26 July 2016	SD1	7.98	297	<5	<5	18	
ES1616390-003	26 July 2016	SD2	7.86	269	<5	<5	13	
ES1616390-004	26 July 2016	SD3	8.19	439	<5	<5	12	
ES1616390-005	26 July 2016	SD4	8.28	986	8	<5	10	
ES1616390-006	26 July 2016	SD5	7.89	156	13	<5	12	
ES1616390-007	26 July 2016	SB4	9.03	1160	7	<5	3	
ES1618785-001	24 August 2016	A1	9.25	7950	41	<20	20	
ES1618785-002	24 August 2016	A2	8.94	7540	148	<5	12	
ES1618785-003	24 August 2016	A3	8.85	7480	338	<5	17	
ES1618785-004	24 August 2016	B1	8.67	496	22	<5	3	
	24 August 2016	B2	-	-	-	-	-	Under construction
ES1618785-005	24 August 2016	C	9.85	23200	38	<5	2080	
ES1618785-006	24 August 2016	D	8.7	598	9	<5	<1	
ES1621640-001	26 September 2016	SD6	8.27	857	46	<5	18	
ES1621762-001	27 September 2016	SB1	9.08	6390	58	<5	14	
ES1621762-002	27 September 2016	SB2	9.26	2060	14	<5	15	
ES1621762-003	27 September 2016	SB3	9.23	4570	7	<5	13	
ES1621762-004	27 September 2016	SD1	8.11	478	<5	<5	16	
ES1621762-005	27 September 2016	SD2	7.65	181	<5	<5	14	
ES1621762-006	27 September 2016	SD3	7.68	1240	6	<5	16	
ES1621762-007	27 September 2016	SD4	8.28	587	6	<5	5	
ES1621762-008	27 September 2016	SD5	7.29	127	<5	<5	17	
ES1621762-009	27 September 2016	SB4	9.12	3240	5	<5	3	
ES1621762-013	27 September 2016	Box Cut (New)	8.5	8820	2500	<5	10	
ES1621893-001	28 September 2016	A1	9.12	7400	8	<5	6	
ES1621893-002	28 September 2016	A2	8.94	7260	33	<5	10	
ES1621893-003	28 September 2016	A3	8.79	8060	67	<5	11	
ES1621893-004	28 September 2016	B1	8.46	465	<5	<5	3	
ES1621893-005	28 September 2016	B2	9.03	6160	12	<5	8	
ES1621893-006	28 September 2016	C	9.83	22900	45	<5	41	
ES1621893-007	28 September 2016	D	8.29	494	45	<5	7	
ES1624027-001	24 October 2016	SD6	8.9	936	69	<5	24	
ES1624027-003	24 October 2016	SB3	9.6	5410	16	<5	17	
ES1624169-001	25 October 2016	SB1	9.7	6950	20	<5	9	
ES1624169-002	25 October 2016	SB2	9.8	2450	21	<5	16	
ES1624169-003	25 October 2016	SD2	7.8	205	22	<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
ES1624169-004	25 October 2016	SD1	8.4	502	<5	<5	11	
ES1624169-005	25 October 2016	SD3	7.3	546	9	<5	12	
ES1624169-006	25 October 2016	SD4	8.9	803	10	<5	8	
ES1624169-007	25 October 2016	SD5	7.5	155	<5	<5	15	
ES1624169-008	25 October 2016	SB4	9.4	3210	9	<5	3	
ES1624169-013	25 October 2016	Box Cut	8.9	8780	1060	<5	136	
ES1624321-001	26 October 2016	A1	8.9	7440	16	<5	3	
ES1624321-002	26 October 2016	A2	8.95	7850	11	<5	6	
ES1624321-003	26 October 2016	A3	8.89	8040	32	<5	1	
ES1624321-004	26 October 2016	B1	8.57	508	<5	<5	4	
ES1624321-005	26 October 2016	B2	8.99	7150	20	<5	6	
ES1624321-006	26 October 2016	C	9.47	23700	56	<5	878	
ES1624321-007	26 October 2016	D	8.47	449	5	<5	6	
ES1626862-001	23 November 2016	SB1	9.15	9980	107	<5	41	
ES1626862-002	23 November 2016	SB2	9.38	2940	11	<5	15	
ES1626862-003	23 November 2016	SD3	8.51	520	8	<5	8	
ES1626862-004	23 November 2016	SD4	9.27	958	32	<5	9	
ES1626866-001	23 November 2016	A1	9.01	7780	13	<5	14	
ES1626866-002	23 November 2016	A2	8.92	7900	50	<5	10	
ES1626866-003	23 November 2016	A3	8.87	8150	13	<5	7	
ES1626866-004	23 November 2016	B1	8.56	490	<5	<5	4	
ES1626866-005	23 November 2016	B2	9.28	7430	30	<5	20	
ES1626866-006	23 November 2016	C	9.62	24200	50	<5	<1	
ES1626866-007	23 November 2016	D	8.62	414	14	<5	80	
ES1627003-001	24 November 2016	SB3	9.52	7750	10	<5	22	
ES1627003-002	24 November 2016	SD1	8.31	582	8	<5	10	
ES1627003-003	24 November 2016	SD2	8.2	233	186	<5	11	
ES1627003-004	24 November 2016	SD5	8.07	199	40	<5	14	
ES1627003-005	24 November 2016	SD6	8.79	1080	20	<5	16	
ES1627003-011	24 November 2016	Box Cut (New)	8.8	8870	138	<5	32	
ES1627003-012	24 November 2016	SB4	9.33	3580	13	<5	5	
ES1629327-001	19 December 2016	SB1	9.9	8890	12	20	5	
ES1629327-002	19 December 2016	SB2	9.8	3430	40	13	23	
ES1629327-003	19 December 2016	SB3	9.8	8020	16	<5	20	
ES1629327-005	19 December 2016	Box Cut (New)	9.2	10500	1050	13	99	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1629456-001	20 December 2016	SD1	8.4	661	31	<5	18	
ES1629456-002	20 December 2016	SD2	8.7	433	235	<5	15	
ES1629456-003	20 December 2016	SD3	8.9	552	40	<5	10	
ES1629456-004	20 December 2016	SD5	8.3	258	38	<5	16	
ES1629456-005	20 December 2016	SD6	9.2	1200	11	<5	19	
ES1629456-010	20 December 2016	SB4	9.9	3740	46	<5	6	
ES1629583-001	21 December 2016	A1	9.7	7970	7	<5	8	
ES1629583-002	21 December 2016	A2	9.3	8520	<5	<5	10	
ES1629583-003	21 December 2016	A3	9.7	8530	<5	<5	8	
ES1629583-004	21 December 2016	B1	8.6	522	<5	<5	8	
ES1629583-005	21 December 2016	B2	9.9	8130	22	<5	24	
ES1629583-006	21 December 2016	C	10.1	24000	70	7	212	
ES1629583-007	21 December 2016	D	8.7	436	17	<5	22	
ES1701784-001	24 January 2017	SB1	9.5	8670	22	<5	10	
ES1701784-002	24 January 2017	SB2	9.8	4110	47	<5	31	
ES1701784-003	24 January 2017	SB3	9.9	8720	<5	6	25	
ES1701784-008	24 January 2017	Box Cut (New)	9.2	7290	1590	<5	92	
ES1701905-001	25 January 2017	SD1	8.7	797	109	<5	16	
ES1701905-002	25 January 2017	SD2	8.8	924	2330	<5	33	Water level low
ES1701905-003	25 January 2017	SD3	9.1	978	36	<5	13	
ES1701905-004	25 January 2017	SD5	8.4	335	60	<5	13	
ES1701905-005	25 January 2017	SD6	9.2	1390	57	<5	19	
ES1701905-006	25 January 2017	SB4	9.44	4670	13	<5	7	
ES1702098-001	30 January 2017	A1	9.6	8830	12	<5	21	
ES1702098-002	30 January 2017	A2	9.5	8790	71	<5	10	
ES1702098-003	30 January 2017	A3	9.4	9640	18	<5	14	
ES1702098-004	30 January 2017	B1	8.5	429	8	<5	42	
ES1702098-005	30 January 2017	B2	9.7	9120	22	<5	30	
ES1702098-006	30 January 2017	C	9.9	25600	78	<5	2	
ES1702098-007	30 January 2017	D	8.9	523	46	<5	39	
ES1703999-001	20 February 2017	SB3	10.1	9920	41	<5	54	
ES1703999-002	20 February 2017	SD6	9.4	1550	24	<5	30	
ES1704141-001	21 February 2017	SB1	9.7	11100	8	<5	15	
ES1704141-002	21 February 2017	SB2	9.9	4830	59	<5	44	
ES1704141-003	21 February 2017	SD1	8.8	927	138	<5	49	
ES1704141-004	21 February 2017	SD3	8.7	821	31	<5	8	
ES1704141-005	21 February 2017	SD5	8.3	422	56	<5	23	
ES1704141-006	21 February 2017	SB4	9.9	5090	<5	<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
ES1704141-007	21 February 2017	Box Cut	9.2	6110	87	<5	34	
ES1704357-001	23 February 2017	A1	9.4	9290	14	<5	8	
ES1704357-002	23 February 2017	A2	9.1	8040	147	<5	31	
ES1704357-003	23 February 2017	A3	9.4	9870	5	<5	8	
ES1704357-004	23 February 2017	B1	8.5	461	<5	<5	8	
ES1704357-005	23 February 2017	B2	9.6	10500	24	<5	35	
ES1704357-006	23 February 2017	C	9.9	26500	40	<5	61	
ES1704357-007	23 February 2017	D	8.2	359	21	<5	12	
ES1707309-001	27 March 2017	SB3	9.9	5870	20	<5	36	
ES1707309-002	27 March 2017	SD6	9.2	1250	39	<5	22	
ES1707309-003	27 March 2017	SB4	9.7	4670	14	<5	24	
ES1707309-005	27 March 2017	Box Cut (New)	8.9	7590	1390	33	132	
ES1707467-001	28 March 2017	SB1	9.9	6970	58	<5	16	
ES1707467-002	28 March 2017	SB2	9.8	3980	21	<5	28	
ES1707467-003	28 March 2017	SD1	8.2	717	173	<5	16	
ES1707467-004	28 March 2017	SD2	6.5	279	<5	<5	15	
ES1707467-005	28 March 2017	SD3	8.8	712	<5	<5	14	
ES1707467-006	28 March 2017	SD4	8.3	994	38	<5	11	
ES1707467-007	28 March 2017	SD5	7.9	348	28	<5	14	
ES1707557-001	29 March 2017	A1	9.6	8920	43	<5	8	
ES1707557-002	29 March 2017	A2	9.5	7140	626	<5	7	
ES1707557-003	29 March 2017	A3	9.7	9790	8	<5	12	
ES1707557-004	29 March 2017	B1	9.2	534	<5	<5	7	
ES1707557-005	29 March 2017	B2	10.3	10200	18	<5	45	
ES1707557-006	29 March 2017	C	10.1	26200	121	<5	<1	
ES1707557-007	29 March 2017	D	8.9	419	18	<5	11	
ES1709758-001	24 April 2017	SB3	10.1	6740	10	<5	31	
ES1709758-002	24 April 2017	SB4	9.9	4820	9	<5	7	
ES1709943-001	26 April 2017	SB1	9.8	8050	85	16	240	
ES1709943-002	26 April 2017	SB2	9.9	3970	37	<5	173	
ES1709943-003	26 April 2017	SD1	8.7	905	212	<5	<1	
ES1709943-004	26 April 2017	SD2	7.6	396	82	<5	11	
ES1709943-005	26 April 2017	SD3	8.9	778	47	<5	13	
ES1709943-006	26 April 2017	SD4	8.5	1710	70	<5	10	
ES1709943-007	26 April 2017	SD5	9.6	362	198	<5	24	
ES1709943-008	26 April 2017	SD6	9.4	1340	18	<5	15	
ES1709943-009	26 April 2017	Box Cut	8.9	4790	534	<5	198	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1710019-001	27 April 2017	A1	9.9	8800	<5	<5	8	
ES1710019-002	27 April 2017	A2	9.6	8370	12	6	7	
ES1710019-003	27 April 2017	A3	9.8	9750	6	8	8	
ES1710019-004	27 April 2017	B1	8.8	555	<5	<5	6	
ES1710019-005	27 April 2017	B2	10.2	10700	7	7	32	
ES1710019-006	27 April 2017	C	10.2	27000	74	5	71	
ES1710019-007	27 April 2017	D	8.7	541	18	<5	12	
ES1713133-001	29 May 2017	SB1	10.2	7930	30	6	8	
ES1713133-002	29 May 2017	SD1	8	548	73	16	19	
ES1713133-003	29 May 2017	SD2	7.3	242	7	7	13	
ES1713133-004	29 May 2017	SD5	9.1	309	155	<5	33	
ES1713133-005	29 May 2017	SD6	9.4	1270	31	<5	22	
ES1713220-001	30 May 2017	SB2	10.1	3290	40	<5	30	
ES1713220-002	30 May 2017	SB3	10.3	5710	102	<5	19	
ES1713220-003	30 May 2017	SD3	7.8	558	42	<5	20	
ES1713220-004	30 May 2017	SD4	8.6	633	212	<5	6	
ES1713220-005	30 May 2017	SB4	10.2	4520	20	<5	8	
ES1713220-006	30 May 2017	Box Cut	9.1	7620	2700	<5	45	
ES1713336-001	31 May 2017	A1	9.9	8130	13	<5	10	
ES1713336-002	31 May 2017	A2	9.5	7760	101	<5	6	
ES1713336-003	31 May 2017	A3	9.8	9060	9	<5	4	
ES1713336-004	31 May 2017	B1	9.9	1120	<5	<5	6	
ES1713336-005	31 May 2017	B2	10.2	10200	8	<5	27	
ES1713336-006	31 May 2017	C	10.4	22800	21	<5	52	
ES1713336-007	31 May 2017	D	8.5	655	16	<5	8	
ES1715692-001	26 June 2017	SD6	9.6	1290	17	<5	18	
ES1715692-002	26 June 2017	SB4	10.7	4640	6	<5	9	
ES1715889-001	27 June 2017	SB1	9.5	8430	12	<5	5	
ES1715889-002	27 June 2017	SB2	10.1	3280	42	<5	28	
ES1715889-003	27 June 2017	SB3	9.9	6050	74	<5	15	
ES1715889-004	27 June 2017	SD3	8.6	773	43	<5	14	
ES1715889-005	27 June 2017	SD4	8.4	947	14	<5	7	
ES1715889-010	27 June 2017	Box Cut	9.1	7380	5060	<5	73	
ES1715930-001	28 June 2017	SD1	7.6	605	42	<5	14	
ES1715930-002	28 June 2017	SD2	7.9	262	8	<5	13	
ES1715930-003	28 June 2017	SD5	6.4	140	12	<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
ES1716080-001	29 June 2017	A1	9.5	7930	92	<5	6	
ES1716080-002	29 June 2017	A2	9.5	6210	536	<5	9	
ES1716080-003	29 June 2017	A3	9.5	8150	150	<5	9	
ES1716080-004	29 June 2017	B1	8.3	685	<5	<5	5	
ES1716080-005	29 June 2017	B2	10.3	9010	856	<5	18	
ES1716080-006	29 June 2017	C	10.4	22100	1660	<5	65	
ES1716080-007	29 June 2017	D	8.4	769	18	<5	4	
ES1718432-001	25 July 2017	SB3	10.2	6650	67	<5	26	
ES1718432-002	25 July 2017	SD6	9.3	1190	148	<5	19	
ES1718432-003	25 July 2017	SB4	9.9	4530	11	<5	9	
ES1718432-004	25 July 2017	Box Cut	9.2	8270	1200	8	40	
ES1718538-001	26 July 2017	SB1	9.5	10500	12	<5	10	
ES1718538-002	26 July 2017	SB2	10.4	2830	44	<5	31	
ES1718538-003	26 July 2017	SD1	7.9	521	28	<5	17	
ES1718538-004	26 July 2017	SD2	7.8	278	<5	<5	11	
ES1718538-005	26 July 2017	SD3	8.9	742	18	<5	12	
ES1718538-006	26 July 2017	SD4	9.4	1110	5	<5	9	
ES1718538-007	26 July 2017	SD5	8.3	277	157	<5	20	
ES1718675-001	27 July 2017	A1	9.9	7990	<5	<5	5	
ES1718675-002	27 July 2017	A2	9.3	8570	134	<5	8	
ES1718675-003	27 July 2017	A3	9.6	8720	6	<5	8	
ES1718675-004	27 July 2017	B1	8.8	875	<5	<5	2	
ES1718675-005	27 July 2017	B2	10.1	9570	7	<5	19	
ES1718675-006	27 July 2017	C	10.4	25000	34	<5	128	
ES1718675-007	27 July 2017	D	8.2	787	<5	<5	3	
ES1721601-001	29 August 2017	SB3	10.4	8730	46	<5	39	
ES1721712-001	30 August 2017	SB1	9.3	10300	11	<5	4	
ES1721712-002	30 August 2017	SB2	9.9	3040	40	<5	22	
ES1721712-003	30 August 2017	SB4	9.9	5070	14	<5	11	
ES1721712-004	30 August 2017	SD1	7.9	594	32	<5	17	
ES1721712-005	30 August 2017	SD2	8.7	314	6	<5	11	
ES1721712-006	30 August 2017	SD3	8.4	681	8	<5	13	
ES1721712-007	30 August 2017	SD4	9.8	1400	12	<5	9	
ES1721712-008	30 August 2017	SD5	8.4	329	160	<5	23	
ES1721712-009	30 August 2017	SD6	9.5	1330	22	<5	20	
ES1721712-010	30 August 2017	Box Cut	8.9	7570	877	<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
ES1721873-001	31 August 2017	A1	9.2	9020	9	<5	9	
ES1721873-002	31 August 2017	A2	9.1	9490	112	<5	5	
ES1721873-003	31 August 2017	A3	9.3	9680	11	<5	11	
ES1721873-004	31 August 2017	B1	7.8	589	<5	<5	2	
ES1721873-005	31 August 2017	B2	9.6	10200	9	<5	20	
ES1721873-006	31 August 2017	C	9.9	25500	23	<5	46	
ES1721873-007	31 August 2017	D	8.7	771	7	<5	27	
ES1723718-001	20 September 2017	A1	9.7	9080	6	<5	2	
ES1723718-002	20 September 2017	A2	9.3	8970	33	<5	8	
ES1723718-003	20 September 2017	A3	9.6	9490	12	<5	11	
ES1723718-004	20 September 2017	B1	8.4	587	<5	<5	2	
ES1723718-005	20 September 2017	B2	9.8	9980	8	<5	18	
ES1723718-006	20 September 2017	C	10.1	25800	54	<5	50	
ES1723718-007	20 September 2017	D	8.7	754	14	<5	4	
ES1724396-001	27 September 2017	SB1	9.4	9820	11	<5	10	
ES1724396-002	27 September 2017	SB2	9.8	3080	8	<5	26	
ES1724396-003	27 September 2017	SB3	9.9	10100	19	<5	35	
ES1724396-004	27 September 2017	SB4	9.7	5210	8	<5	9	
ES1724396-005	27 September 2017	SD1	7.9	656	80	<5	16	
ES1724396-006	27 September 2017	SD2	8.3	349	8	<5	12	
ES1724396-007	27 September 2017	SD3	8.7	711	15	<5	12	
ES1724396-008	27 September 2017	SD4	9.1	1660	30	<5	15	
ES1724396-009	27 September 2017	SD5	9	387	212	<5	32	
ES1724396-010	27 September 2017	SD6	9.3	1360	26	<5	22	
ES1724396-018	27 September 2017	Box Cut	9.3	7940	1590	<5	71	
ES1726820-001	25 October 2017	SB3	9.4	9280	39	<5	33	
ES1726957-001	26 October 2017	SB1	9.1	8390	40	<5	15	
ES1726957-002	26 October 2017	SB2	9.7	3050	22	<5	26	
ES1726957-003	26 October 2017	SB4	9.5	5340	12	<5	11	
ES1726957-004	26 October 2017	SD1	8.1	741	40	<5	16	
ES1726957-005	26 October 2017	SD2	8	390	<5	<5	10	
ES1726957-006	26 October 2017	SD3	8.9	1020	8	<5	15	
ES1726957-007	26 October 2017	SD4	9.3	1880	14	<5	11	
ES1726957-008	26 October 2017	SD5	8.8	382	168	<5	43	
ES1726957-009	26 October 2017	SD6	9.2	1420	<5	<5	21	
ES1726957-010	26 October 2017	Box Cut	8.5	6290	40	<5	14	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1727189-001	30 October 2017	A1	9.6	9450	20	<5	11	
ES1727189-002	30 October 2017	A2	9.5	8360	7	<5	7	
ES1727189-003	30 October 2017	A3	9.6	7890	88	<5	21	
ES1727189-004	30 October 2017	B1	8.3	702	9	<5	2	
ES1727189-005	30 October 2017	B2	9.8	14000	31	<5	41	
ES1727189-006	30 October 2017	C	10.3	26400	147	<5	83	
ES1727189-007	30 October 2017	D	8.2	797	18	<5	1	
ES1730057-001	28 November 2017	SB3	9.9	8790	38	<5	38	
ES1730057-002	28 November 2017	SD6	10.2	1540	8	<5	29	
ES1730327-001	29 November 2017	SB1	9.2	6960	80	<5	25	
ES1730327-002	29 November 2017	SB2	9.8	2910	12	<5	27	
ES1730327-003	29 November 2017	SD1	8.7	849	16	<5	17	
ES1730327-004	29 November 2017	SD2	9	427	<5	<5	12	
ES1730327-005	29 November 2017	SD3	8.9	783	14	<5	15	
ES1730327-006	29 November 2017	SD4	9.4	2130	11	<5	13	
ES1730327-007	29 November 2017	SD5	8.5	435	11	<5	26	
ES1730327-008	29 November 2017	SB4	9.6	5460	9	<5	12	
ES1730327-009	29 November 2017	Box Cut	8.9	7630	1660	<5	241	
ES1730406-001	30 November 2017	A1	9.3	8430	22	<5	8	
ES1730406-002	30 November 2017	A2	9.1	7670	13	<5	4	
ES1730406-003	30 November 2017	A3	9.1	7660	50	<5	16	
ES1730406-004	30 November 2017	B1	8.5	703	<5	<5	2	
ES1730406-005	30 November 2017	B2	9.2	16400	29	<5	32	
ES1730406-006	30 November 2017	C	9.6	27200	1060	<5	143	
ES1730406-007	30 November 2017	D	8.4	821	8	<5	5	
ES1732269-001	18 December 2017	SD5	8.6	487	72	<5	17	
ES1732269-002	18 December 2017	SD6	9.7	1584	23	<5	30	
ES1732447-001	19 December 2017	SB1	9.3	8160	80	11	29	
ES1732447-002	19 December 2017	SB2	9.7	3060	24	<5	25	
ES1732447-003	19 December 2017	SB3	9.8	8250	52	<5	50	
ES1732447-004	19 December 2017	SB4	9.8	6030	60	<5	10	
ES1732447-005	19 December 2017	SD1	8.8	894	80	<5	17	
ES1732447-006	19 December 2017	SD2	8.8	458	25	<5	11	
ES1732447-007	19 December 2017	SD3	9	802	40	<5	18	
ES1732447-008	19 December 2017	SD4	9.8	2210	40	<5	14	
ES1732447-013	19 December 2017	BOX CUT	8.7	7430	2420	<5	189	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1732579-001	20 December 2017	A1	9.5	8540	<5	<5	5	
ES1732579-002	20 December 2017	A2	9.2	7850	9	<5	6	
ES1732579-003	20 December 2017	A3	9.1	8160	75	<5	11	
ES1732579-004	20 December 2017	B1	8.7	745	<5	<5	2	
ES1732579-005	20 December 2017	B2	9.3	15850	20	<5	30	
ES1732579-006	20 December 2017	C	9.8	27640	75	<5	60	
ES1732579-007	20 December 2017	D	7.8	732	16	<5	6	
ES1803428-001	30 January 2018	SD6	9.7	1900	34	<5	36	
ES1803428-006	30 January 2018	BOX CUT	9.7	9270	21700	<5	2090	
ES1803201-001	25 January 2018	A1	8.8	9530	563	<5	93	
ES1803201-002	25 January 2018	A2	8.6	9260	10	<5	8	
ES1803201-003	25 January 2018	A3	8.4	9290	132	<5	29	
ES1803201-004	25 January 2018	B1	8	831	<5	<5	3	
ES1803201-005	25 January 2018	B2	8.7	23500	49	<5	43	
ES1803201-006	25 January 2018	C	9.2	30300	74	<5	79	
ES1803201-007	25 January 2018	D	7.8	836	32	<5	5	
ES1803594-001	31 January 2018	SB1	9.3	8610	61	<5	9	
ES1803594-002	31 January 2018	SB2	9.7	3320	69	<5	23	
ES1803594-003	31 January 2018	SB3	9.6	9980	53	<5	84	
ES1803594-004	31 January 2018	SB4	9.6	6870	41	<5	15	Water level low
ES1803594-005	31 January 2018	SD1	8.9	1290	45	<5	32	Water level low
ES1803594-006	31 January 2018	SD2	8.8	593	24	<5	17	
ES1803594-007	31 January 2018	SD3	9	1040	82	<5	27	
ES1803594-008	31 January 2018	SD4	9.5	3050	57	<5	32	Water level low
ES1803594-009	31 January 2018	SD5	8.8	632	62	<5	27	
ES1805799-001	22 February 2018	A1	9.6	10000	<5	<5	7	
ES1805799-002	22 February 2018	A2	9.3	9620	7	<5	6	
ES1805799-003	22 February 2018	A3	9.2	9480	46	<5	16	
ES1805799-004	22 February 2018	B1	8.9	760	<5	<5	4	
ES1805799-005	22 February 2018	B2	9.6	27500	94	<5	50	
ES1805799-006	22 February 2018	C	9.9	21300	139	<5	80	
ES1805799-007	22 February 2018	D	8.9	582	31	<5	12	
ES1806209-001	26 February 2018	BOX CUT	9	7470	1720	28	326	
ES1806273-001	27 February 2018	SB1	9.7	8270	44	<5	18	
ES1806273-002	27 February 2018	SB2	9.7	3730	21	<5	23	
ES1806273-003	27 February 2018	SB3	9.9	10300	128	<5	48	
ES1806273-004	27 February 2018	SB4	9.9	7620	36	<5	21	
ES1806273-005	27 February 2018	SD1	9.4	1430	76	<5	38	Water level low
ES1806273-006	27 February 2018	SD2	9.3	656	63	<5	18	
ES1806273-007	27 February 2018	SD3	9.6	1480	60	<5	29	
ES1806273-008	27 February 2018	SD4	9.8	3340	57	<5	22	
ES1806273-009	27 February 2018	SD5	8.9	711	84	<5	25	
ES1806273-010	27 February 2018	SD6	9.5	2180	29	<5	32	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1809042-001	26 March 2018	SB3	9.9	9630	86	<5	69	
ES1809042-002	26 March 2018	SD6	9.8	2150	28	<5	41	
ES1809255-001	27 March 2018	SB1	9.6	9840	20	<5	12	
ES1809255-002	27 March 2018	SB2	9.8	4090	44	<5	57	
ES1809255-003	27 March 2018	SB4	9.9	11600	14	<5	24	
ES1809255-004	27 March 2018	SD1	9.9	1980	255	<5	96	Water level low
ES1809255-005	27 March 2018	SD2	9.8	797	123	<5	42	
ES1809255-006	27 March 2018	SD3	9.7	1780	522	<5	52	
ES1809255-007	27 March 2018	SD4	9.9	4890	113	<5	41	
ES1809255-008	27 March 2018	SD5	9.6	910	116	<5	56	
ES1809255-012	27 March 2018	BOX CUT	9.1	5840	8550	<5	101	
ES1809373-001	28 March 2018	A1	9.6	8970	5	<5	6	
ES1809373-002	28 March 2018	A2	9.4	8160	12	<5	8	
ES1809373-003	28 March 2018	A3	9.3	7960	41	<5	35	
ES1809373-004	28 March 2018	B1	9.3	997	<5	<5	5	
ES1809373-005	28 March 2018	B2	9.7	24300	119	<5	51	
ES1809373-006	28 March 2018	C	9.9	32600	340	<5	36	
ES1809373-007	28 March 2018	D	8.7	8870	22	<5	207	
ES1811723-001	23 April 2018	SB3	9.9	12200	46	<5	73	
ES1811723-002	23 April 2018	SD6	9.9	2720	50	<5	50	
ES1811723-003	23 April 2018	BOX CUT	9.1	6620	6590	<5	47	
ES1811866-001	24 April 2018	SB1	9.9	10600	7	<5	21	
ES1811866-002	24 April 2018	SB2	9.8	4120	42	<5	28	
ES1811866-003	24 April 2018	SB4	9.9	1700	69	<5	31	Water level low
ES1811866-004	24 April 2018	SD1	9.9	2680	213	<5	108	Water level low
ES1811866-005	24 April 2018	SD2	9.8	906	418	5	48	
ES1811866-006	24 April 2018	SD3	9.5	2340	1080	<5	59	
ES1811866-007	24 April 2018	SD4	9.6	7390	427	<5	55	Water level low
ES1811866-008	24 April 2018	SD5	9.4	1140	146	<5	47	
ES1812017-001	26 April 2018	A1	9.6	9120	8	<5	7	
ES1812017-002	26 April 2018	A2	9.4	8420	18	<5	12	
ES1812017-003	26 April 2018	A3	9.2	7930	127	<5	53	
ES1812017-004	26 April 2018	B1	9.1	837	36	<5	3	
ES1812017-005	26 April 2018	B2	9.7	25700	137	<5	34	
ES1812017-006	26 April 2018	D	8.6	826	18	<5	5	
ES1812017-007	26 April 2018	C	9.9	28300	60	<5	77	
ES1815199-001	24 May 2018	A1	9.8	8720	8	<5	12	
ES1815199-002	24 May 2018	A2	9.7	8170	50	<5	12	
ES1815199-003	24 May 2018	A3	9.6	7930	268	<5	31	
ES1815199-004	24 May 2018	B1	8.9	786	8	<5	3	
ES1815199-005	24 May 2018	B2	9.9	24000	87	<5	46	
ES1815199-006	24 May 2018	C	9.9	34500	36	<5	81	
ES1815199-007	24 May 2018	D	9.6	1020	35	<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
ES1815538-001	28 May 2018	SB3	9.9	12100	63	<5	68	
ES1815538-002	28 May 2018	SB4	10	26000	1450	<5	2060	Water level low, difficult to get sample
ES1815538-003	28 May 2018	SD6	9.9	2580	56	<5	41	
ES1815538-004	28 May 2018	BOX CUT	9.3	6050	13300	23	313	
ES1815667-001	29 May 2018	SB1	9.8	8290	113	29	92	
ES1815667-002	29 May 2018	SB2	9.9	3710	24	<5	37	
ES1815667-003	29 May 2018	SD1	10.1	3940	598	<5	237	Water level low
ES1815667-004	29 May 2018	SD2	9.7	987	200	<5	60	Water level low
ES1815667-005	29 May 2018	SD3	9.3	2610	809	<5	78	Water level low
ES1815667-006	29 May 2018	SD5	9.9	1340	702	<5	78	Water level low
ES1818683-001	25 June 2018	SB3	9.6	11400	226	<5	84	
ES1818683-002	25 June 2018	SD6	9.4	2680	43	<5	52	
ES1818683-003	25 June 2018	BOX CUT	8.7	7010	17800	<5	30	
ES1818823-001	26 June 2018	SB1	9.3	8170	34	<5	10	
ES1818823-002	26 June 2018	SB2	9.5	3690	23	<5	33	
ES1818823-003	26 June 2018	SB4	9.9	34200	317	<5	2680	Water level low
ES1818823-004	26 June 2018	SD2	9.2	1050	219	<5	41	Water level low
ES1818823-005	26 June 2018	SD3	9.2	3320	161	<5	102	Water level low
ES1818823-006	26 June 2018	SD5	8.8	494	12	<5	18	Water level low
ES1818976-001	27 June 2018	A1	9.2	8260	6	<5	10	
ES1818976-002	27 June 2018	A2	9	8040	37	<5	8	
ES1818976-003	27 June 2018	A3	9	8070	247	<5	10	
ES1818976-004	27 June 2018	B1	8.7	830	<5	<5	3	
ES1818976-005	27 June 2018	B2	9.5	22400	59	<5	234	
ES1818976-006	27 June 2018	C	9.8	34800	34	<5	45	
ES1818976-007	27 June 2018	D	8.4	860	16	<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
ES1821823-001	24 July 2018	SB3	9.4	9720	634	12	32	
ES1821823-002	24 July 2018	SD6	9.5	2840	90	<5	46	Water level low
ES1822106-001	25 July 2018	SB1	9.4	8730	42	<5	18	
ES1822106-002	25 July 2018	SB2	9.6	3410	24	<5	31	
ES1822106-003	25 July 2018	SD2	9.5	1100	98	<5	45	Water level low
ES1822106-004	25 July 2018	SD3	9.6	4230	3250	<5	137	Water level low
ES1822106-005	25 July 2018	SD5	8.7	508	10	<5	16	
ES1822106-007	25 July 2018	BOX CUT	9.1	7580	4220	15	18	
ES1822346-001	30 July 2018	A1	9.2	8270	14	<5	16	
ES1822346-002	30 July 2018	A2	9.1	8220	20	<5	10	
ES1822346-003	30 July 2018	A3	8.8	8620	132	<5	16	
ES1822346-004	30 July 2018	B1	8.2	768	<5	<5	3	
ES1822346-005	30 July 2018	B2	9.5	24800	86	<5	57	
ES1822346-006	30 July 2018	C	9.8	34200	48	<5	90	
ES1822346-007	30 July 2018	D	9.4	1320	5	<5	4	
ES1825239-001	23 August 2018	SB1	9.6	8590	52	<5	33	
ES1825239-002	23 August 2018	SB2	9.7	3230	29	<5	31	
ES1825239-003	23 August 2018	SB3	9.9	10200	31	<5	42	
ES1825239-004	23 August 2018	SD2	9.8	1240	183	<5	74	Water level low
ES1825239-005	23 August 2018	SD3	9.7	3980	223	<5	137	Water level low
ES1825239-006	23 August 2018	SD5	8.8	536	25	<5	18	
ES1825239-007	23 August 2018	SD6	9.7	2830	63	6	51	Water level low
ES1822106-009	23 August 2018	BOX CUT	8.7	6930	2760	6	50	
ES1825756-001	29 August 2018	A1	9.2	8230	131	6	17	
ES1825756-002	29 August 2018	A2	9.1	8160	40	<5	10	
ES1825756-003	29 August 2018	A3	8.9	7980	93	<5	10	
ES1825756-004	29 August 2018	B1	8.1	717	<5	7	2	
ES1825756-005	29 August 2018	B2	9.5	25400	96	9	45	
ES1825756-006	29 August 2018	C	10.1	35600	472	6	197	
ES1825756-007	29 August 2018	D	9.3	722	14	6	10	
ES1828355-001	24 September 2018	SB1	9.8	8680	16	<5	12	
ES1828355-002	24 September 2018	SB2	9.9	3260	29	<5	42	
ES1828355-003	24 September 2018	SB3	10.1	10500	61	<5	48	
ES1828355-004	24 September 2018	SD6	9.8	3410	18	6	46	
ES1828355-005	24 September 2018	BOX CUT	9.2	8320	2000	13	335	
ES1828483-001	25 September 2018	SD3	10.1	6310	215	10	245	Water level low
ES1828483-002	25 September 2018	SD5	8.7	619	36	<5	22	

Sample No.	Date	Sample Location	pH	Electrical Conductivity (µS/cm)	Total Suspended Solids (mg/L)	Grease & Oil (mg/L)	Total Organic Carbon (TOC)	Comments
ES1828627-001	26 September 2018	A1	9.6	8230	22	<5	10	
ES1828627-002	26 September 2018	A2	9.4	7650	16	<5	6	
ES1828627-003	26 September 2018	A3	9.3	7630	33	<5	7	
ES1828627-004	26 September 2018	B1	8.4	901	<5	<5	8	
ES1828627-005	26 September 2018	B2	9.9	25000	123	<5	45	
ES1828627-006	26 September 2018	C	10	36700	18	<5	4370	
ES1828627-007	26 September 2018	D	9.8	1050	26	<5	12	
ES1831694-001	24 October 2018	A1	9.7	8310	20	7	6	
ES1831694-002	24 October 2018	A2	9.5	8030	28	7	12	
ES1831694-003	24 October 2018	A3	9.3	8620	66	<5	2	
ES1831694-004	24 October 2018	B1	8.7	957	<5	<5	4	
ES1831694-005	24 October 2018	B2	9.8	25720	64	<5	9	
ES1831694-006	24 October 2018	C	9.9	37310	106	<5	5	
ES1831694-007	24 October 2018	D	8.5	794	48	<5	7	
ES1832272-001	29 October 2018	SB1	9.6	8870	20	<5	15	
ES1832272-002	29 October 2018	SB2	9.8	3480	21	<5	29	
ES1832272-003	29 October 2018	SB3	9.7	9760	44	<5	59	
ES1832272-004	29 October 2018	SD4	9.9	5220	24	<5	18	
ES1832272-005	29 October 2018	SD5	8.3	774	92	<5	36	
ES1832272-006	29 October 2018	SD6	9.7	3970	204	<5	73	
ES1832272-007	29 October 2018	SB4	10.1	16400	13	<5	68	Dam water level low
ES1832272-010	29 October 2018	BOX CUT	7.9	9130	4340	12	372	
ES1834946-001	21 November 2018	A1	9.1	8960	67	<5	13	
ES1834946-002	21 November 2018	A2	9	8820	22	<5	<1	
ES1834946-003	21 November 2018	A3	8.9	9070	62	<5	283	
ES1834946-004	21 November 2018	B1	8.4	825	66	<5	7	
ES1834946-005	21 November 2018	B2	9.3	25500	204	<5	19	
ES1834946-006	21 November 2018	C	9.8	38800	141	<5	95	
ES1834946-007	21 November 2018	D	8.7	639	46	<5	16	
ES1835580-001	27 November 2018	SB1	9.4	8020	72	<5	162	
ES1835580-002	27 November 2018	SB2	9.2	3420	14	<5	19	
ES1835580-003	27 November 2018	SB3	9.6	8750	17	<5	203	
ES1835580-004	27 November 2018	SD4	9.4	1180	39	<5	2	Dam water level low
ES1835580-005	27 November 2018	SD5	8.5	678	141	<5	26	
ES1835580-006	27 November 2018	SD6	9.6	4350	38	<5	59	Dam water level low
ES1835580-007	27 November 2018	SB4	9.9	11900	43	<5	23	Dam water level low
ES1835580-010	27 November 2018	BOX CUT	8.8	9710	18400	9	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
ES1837816-001	13 December 2018	A1	9.4	9150	22	<5	10	
ES1837816-002	13 December 2018	A2	9.2	9020	18	<5	6	
ES1837816-003	13 December 2018	A3	9.3	8760	81	<5	2	
ES1837816-004	13 December 2018	B1	8.2	785	<5	<5	6	
ES1837816-005	13 December 2018	B2	9.5	25000	52	6	156	
ES1837816-006	13 December 2018	C	9.9	36800	110	<5	313	
ES1837816-007	13 December 2018	D	8.8	602	102	<5	12	
ES1838279-001	17 December 2018	SD6	9.9	5080	28	19	89	Dam water level low
ES1838279-002	17 December 2018	SD5	9.4	559	546	<5	27	Dam water level low
ES1838362-001	18 December 2018	SB1	9.7	7880	64	<5	13	
ES1838362-002	18 December 2018	SB2	9.6	3390	8	<5	36	
ES1838362-003	18 December 2018	SB3	9.8	7450	106	<5	45	
ES1838362-004	18 December 2018	SB4	9.9	10200	58	<5	55	Dam water level low
ES1838362-005	18 December 2018	SD4	9.7	1560	25	<5	3	
ES1838362-011	18 December 2018	Box Cut	9.2	7860	7080	<5	30	

Appendix E – *Groundwater Data*

Site ID	Piezometer / Water Bore	Date	Time	Depth to Water - m bgl	Depth to Stand - m bto c	Field Parameters			Total Metals																Major Cations				Total Cations - meq/L	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
						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 (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 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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
P1	NG1	1-Nov-07	1450	52.02	53.00				5	0.5								1	1	1																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														</

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Site ID	Piezometer / Water Bore	Date	Time	Depth to Water - m bgl	Depth to Stand - m bto c	Field Parameters			Total Metals																Major Cations				Total Cations - meq/L	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
						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 (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 Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L								Alkalinity - mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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Site ID	Piezometer / Water Bore	Date	Time	Depth to Water - m bgl	Depth to Stand - m bto c	Field Parameters			Total Metals														pH Lab	EC - Lab - µs/cm	Major Cations				Total Cations - meq/L	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
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		24-Nov-17	1155			Dry			5	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						

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		29-Aug-17	915	43.04	43.85	7.8	3160	21	5	0.5																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			

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						pH - Field	EC- Field - μ S/cm	Temp - Field - $^{\circ}$ C	Aluminium (Al) - mg/L	Arsenic (As) - ng/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (mg/L)	Chromium (Cr) - ng/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	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 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									5	0.5			0.01	1	1	1		0.1		1			20	0.002				1000					1000								1500	400		4000
		28-Feb-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		28-Mar-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		30-Apr-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		29-May-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		26-Jun-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		26-Jul-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		30-Aug-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		25-Sep-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		30-Oct-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		28-Nov-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
		20-Dec-18				Dry - Blocked @ 19m (piezo undermined and blocked)																																						
							16248	28.805	0.544	0.00585	0.50345	#NUM!	0.0005	0.03435	0.0232	0.08338	12.307	0.08985	3.51	0.05313	0.04	0.12113	#NUM!	7.565	15737.5	211.375	298.25	3066.25	68.75	163.875	4813.75	1013.875	#NUM!	#NUM!	1202.5	1202.5	175.625	4.1125	3.606	#NUM!	0.447	0.447	10302	
P16	NC-119D	3-Mar-08	1410	51.25	52.03		10310	23.8	30.6	0.074	0.54	0.006	0.0007	0.087	0.048	0.133	587	0.078	2.7	0.229	0.34	0.381	0.0016	8.05	14300	156	217	2260	56	125	3940	918	0	0	1030	1030	151	9.24	2.61	0	1.72	1.72	8020	
Depth Format.	146 Garrawilla	2-Apr-08	1345	51.24	52.02																																							
		9-May-08	1152	51.21	51.99																																							
		2-Jun-08	1542	51.20	51.98																																							
		1-Jul-08	1525	51.12	51.90																																							
		12-Aug-08	1145	51.08	51.86																																							
		12-Sep-08	0930	50.52	51.30	7.45	1085	20.5		0.001	0.029	<0.001	<0.0001	0.002	<0.001	0.002	4.43	0.394	0.070	0.036	<0.01	0.204	<0.0001		132	5	1	14	3	1.05	22	<1	<1	<1	25	25	1.12		2.00			109		
		14-Nov-08	1227	56.22	57.00																																							
		3-Dec-08	1400	55.22	56.00																																							
		12-Jan-09	1055	48.67	49.45																																							
		23-Feb-09	1250	48.45	49.24																																							
		9-Jun-09	1330	48.45	49.30	Bore pumped dry																																						
				24-Aug-09	1445	47.53	48.37	SWL only																																				
		17-Nov-09	1300	48.16	49.00	6.84	1605	24.1		<0.001	0.135	<0.001	<0.0001	0.001	<0.001	0.023	4.79	0.119	0.299	0.043	<0.01	1.21	<0.0001		1530	23	13	208	14	13.3	324	1.36	<1	<1	235	235	13.9	2.11	23.4				682	
		24-Feb-10	1045	47.00	47.84																																							
		24-Jun-10	1015	47.46	48.30	7.53	1947	18	<0.01	<0.001						0.003	0.33	0.002	0.389	0.016		0.085	<0.0001	7.01	1740	32	16	265	23	15	371	2.78	<1	<1	298	298	16.5	4.61		0.02	0.33	0.35		
		2-Sep-10	1345	46.77	47.61	6.78	2370	24.5																																				
		9-Feb-11	1040	47.50	48.34	6.73	2169	24	0.16	0.002						0.01	0.5	0.031	0.515	0.006		0.063	<0.0001	6.67	2460	38	14	297	32	16.8	478	6	<1	<1	497	497	23.5	16.6		0.23	0.38	0.61		
		08-Jun-11	1030	46.96	47.80	6.85	2480	20.4																																				
		26-Sep-11	1100	47.03	47.87	6.85	2950	21.8	6.22	0.011	0.461	<0.001																																

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Site ID	Piezometer / Water Bore	Date	Time	Depth to Water - m bgl	Depth to Stand - m bto c	Field Parameters			Total Metals														pH Lab	EC - Lab - μ S/cm	Major Cations				Total Cations - meq/L	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
						pH - Field	EC - Field - μ S/cm	Temp - Field - $^{\circ}$ C	Aluminium (Al) - mg/L	Arsenic (As) - mg/L	Barium (Ba) - mg/L	Beryllium (Be) - mg/L	Cadmium (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	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 Alkalinity as CaCO3 - mg/L	Carbonate Alkalinity as CaCO3 - mg/L	Bicarbonate Alkalinity as CaCO3 - mg/L	Alkalinity - mg/L																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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Site ID	Piezometer / Water Bore	Date	Time	Depth to Water - m bgl	Depth to Stand - m bto c	Field Parameters			Total Metals																Major Cations				Total Cations - meq/L	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																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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Denotes dissolved metals