

EPBC ACT ANNUAL COMPLIANCE REPORT 2021

Prepared for:
Stanmore IP Coal Pty Ltd
GPO Box 2602
BRISBANE QLD 4001

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SLR 

PREPARED BY

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
21 River Street
Mackay QLD 4740 Australia
(PO Box 5051 Mackay MC QLD 4741)
T: +61 7 3181 3300
E: mackay@slrconsulting.com www.slrconsulting.com

BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Stanmore IP Coal Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
626.30063-R01-v1.0	6 September 2021	P. Tett	D. Thompson (SLR)/ B. Parfitt (Stanmore)	P. Tett
626.30063-R01-v0.1	25 August 2021	P. Tett	D. Thompson (SLR)/ B. Parfitt (Stanmore)	DRAFT ONLY

EXECUTIVE SUMMARY

Introduction

Stanmore IP Coal Pty Ltd (Stanmore) engaged SLR Consulting Australia Pty. Ltd. (SLR) to prepare the Annual Compliance Report (the Report) for the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Approval for Extension to the existing Isaac Plains Mine, near Moranbah, Queensland (EPBC 2016/7827), (the Approval). The Report is required by Condition 17 of the Approval.

Description of Activities and EPBC Act Approval

The Isaac Plains Complex is located in Central Queensland, approximately 145 kilometres (km) southwest of Mackay and 7 km east of the Moranbah township.

The Isaac Plains East Project is the subject of the Approval and was referred under the EPBC Act in late 2016.

The Approved Action is:

“To undertake the Isaac Plains East Project, developing five open cut coal pits over Lot 4 SP252740, Lot 17 SP261431 and Lot 5 GV132, adjoining the existing Isaac Plains Mine mining lease near Moranbah, Queensland (see EPBC Act referral 2016/7827).”

The action subject to the Approval officially commenced on the 9th of June 2018, subsequently this report is the third report and covers the period of the 9th of June 2020 to the 8th of June 2021.

The Approval relates to the EPBC Act Controlling Provisions:

- Listed threatened species and communities (sections 18 & 18A); and
- Water resources/trigger (sections 24D & 24E).

Specifically, the Approval addresses:

- Clearing of habitat for Koala (*Phascolarctos cinereus*), Squatter Pigeon (Southern) (*Geophaps scripta scripta*), Greater Glider (*Petauroides volans*) and Ornamental Snake (*Denisonia maculata*); and
- Monitoring of surface water, groundwater and riparian zone.

The Approval contains requirements for offsets under the EPBC Act Environmental Offsets Policy, including development of an Offset Area Management Plan (OAMP). The Approval also requires development of a Species Management Plan (SMP) outlining management and monitoring actions to minimise any impact to Listed threatened species under the EPBC Act.

Habitat Impacts and Offset area

Offset areas are required by the Approval to compensate for the habitat clearing required for the Isaac Plains East Project and include impacted habitat for the Koala (125 ha), Greater Glider (125 ha) and Squatter Pigeon (74 ha).

EXECUTIVE SUMMARY

An initial OAMP (Base 2018) included suitable offset area. The initial proposed offset area identified was on Byrne Valley Station near Ayr in North Queensland. However, the negotiation process for securing this offset, undertaken during the period of previous Annual Compliance Reports, was unsuccessful.

A new OAMP (BASE 2020) was developed to reflect the recently negotiated Mt Spencer offset (Figure 1), signed by Stanmore and the Landholder prior to submission to the Department for approval. Approval of the OAMP was received on the 21st of May 2021. The OAMP includes offset areas for the separate Isaac Plains East Extension EPBC Approval (2019/8548) and the Isaac Downs Project EPBC Approval (2019/8413).

Audit Methods

The key site contact was Stanmore's, Senior Advisor – Health, Safety, Environment and Community (HSEC), Belinda Parfitt. The Audit was conducted by SLR Principal Consultant, Paul Tett. Paul has in excess of 30 years' experience as an environmental professional associated with the mining and industrial sectors.

A site visit to the Isaac Plains Complex was undertaken by the auditor on the 13th of July 2021 during which interviews and evidence gathering were undertaken. A site inspection of the Isaac Plains East disturbance footprint was undertaken as part of the site visit.

Compliance status for each Approval Condition was determined in accordance with the rankings C = Complaint, NC = Non-Compliant and NA = Not Applicable.

Key Findings and Recommendations

For the period of the Annual Compliance Report, Stanmore was compliant (as qualified) with all relevant conditions of the Approval.

There were 11 "Not Applicable" findings made during the audit.

No new environmental risks relative to the Approval were identified during the reporting period.

Staff interviewed throughout the audit process demonstrated an in depth understanding of the Approval requirements and the operational system controls required to ensure compliance with the conditions of the Approval. Management commitment to compliance with the Approval was evident.

Observations:

Condition 3 - Whilst one element of the SMP implementation was found to not have been undertaken during the reporting period (annual rehabilitation monitoring) this was not considered to contribute a material impact to the intent of the broader condition. It is noted that rehabilitation monitoring was completed during the week following the end of the reporting period. Therefore as substantial compliance was achieved a compliant finding is considered appropriate.

It is recommended that annual rehabilitation monitoring occur as per the SMP.

EXECUTIVE SUMMARY

Note:

During the site visit an historic area of clearing outside the Approval boundary became evident. This clearing occurred on the 20th of September 2019. An internal investigation was undertaken (at the time) and corrective actions implemented. Notification of the incident to the Department was not undertaken within the timeframe of condition 18 of the Approval, however following the incident becoming evident as part of this audit, notification of the incident to the Department was initiated. Departmental response to the notification (DAWE 2021) affirmed no action was to be taken by the Department beyond a warning for contravention of conditions 1 and 18 of the Approval. As this incident occurred within the previous reporting period it is not considered a Non-Compliance in this Compliance Report. Further information is included (Section 4 (Table 2) Condition 1).

Detailed findings are presented (Table 2).

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and April 2021

1 Introduction

Stanmore IP Coal Pty Ltd (Stanmore) engaged SLR Consulting Australia Pty. Ltd. (SLR) to prepare the Annual Compliance Report (the Report) for the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Approval for Extension to the existing Isaac Plains Mine, near Moranbah, Queensland (EPBC 2016/7827), (the Approval). The Report is required by Condition 17 of the Approval, which states:

“Within three (3) months of every 12 month anniversary of the commencement of the action, the approval holder must publish a report (the Annual Compliance Report) on its website addressing compliance with each of the conditions of this approval, during the previous 12 months. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the Annual Compliance Report is published. Reports must remain published for the life of the approval. The approval holder must continue to publish the Annual Compliance Report each year until such time as agreed to in writing by the Minister.”

The Report presents the findings of an audit which was undertaken to assess the compliance status of Stanmore’s Isaac Plains East operations against the Approval. The audit focused on each of the conditions contained in the Approval. The audit site visit was undertaken on the 13th of July 2021, with evidence gathering and reporting finalised throughout July to September 2021.

The report has been prepared in general accordance with the Annual Compliance Report Guidelines, Commonwealth of Australia 2014.

1.1 Description of Activities and EPBC Act Approval

The Isaac Plains Complex is located in Central Queensland, approximately 145 kilometres (km) southwest of Mackay and 7 km east of the Moranbah township (Figure 1). The Complex includes the original Isaac Plains Open Cut Mine, the adjoining Isaac Plains East Open Cut operations, Isaac Downs (open cut mine project) and the Isaac Plains Underground Mine project. The Isaac Plains East project (formerly Wotonga Project) was acquired by Stanmore in 2015. The project is located adjacent to the east of the Isaac Plains Coal Mine and is currently operational having commenced in June 2018. In December 2018 the Dragline was transferred from Isaac Plains to Isaac Plains East.

Isaac Plains East is the subject of the Approval, which was referred under the EPBC Act in late 2016. The Referral Decision was issued on the 4th of January 2017, being Controlled Action Assessment Approach Preliminary Documentation, public notification of the Preliminary Documentation was undertaken on the 19th of July 2017. The initial Approval (EPBC 2016/7827) was issued to Stanmore IP Coal Pty Ltd (ABN: 79 606 244 615) on the 28th of February 2018. The Approved Action is:

“To undertake the Isaac Plains East Project, developing five open cut coal pits over Lot 4 SP252740, Lot 17 SP261431 and Lot 5 GV132, adjoining the existing Isaac Plains Mine mining lease near Moranbah, Queensland (see EPBC Act referral 2016/7827).”

A variation to the Approval took effect on the 6th of August 2018. The subject of the variation was as below:

“Delete Attachment A attached to the approval and substitute with Attachment A specified over page.”

The variations to Attachment A included minor adjustments to the planned disturbance boundaries. The Project layout including the approved disturbance area is shown (Figure 2).

A further variation to the Approval took effect on the 14th of August 2020. The subject of the variation was as below:

“Delete condition 6 and replace it with condition 6 as specified below. Delete the definition of Squatter Pigeon (Southern) (*Geophaps scripta scripta*) habitat and replace it with the definition specified below.”

Conditions specific to the action 6.

“The approval holder must legally secure the environmental offset/s within three (3) years from the commencement of the clearance of habitat suitable for the Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) and Greater Glider (*Petauroides volans*) and Squatter Pigeon (Southern) (*Geophaps scripta scripta*) habitat.

Definitions

w. Squatter Pigeon (Southern) (*Geophaps scripta scripta*) habitat means:

- i. breeding habitat - Any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by Eucalyptus, Corymbia, Acacia or Callitris species, on sandy or gravelly soils (including, but not limited to, areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 1 km of a suitable, permanent or seasonal waterbody;
- ii. foraging habitat - Any remnant or regrowth open-forest to sparse, open-woodland or scrub dominated by Eucalyptus, Corymbia, Acacia or Callitris species, on sandy or gravelly soils (including, but not limited to, areas mapped as Queensland land zones 3, 5 or 7) and where groundcover vegetation is less than 33% of the ground area, within 3 km of a suitable, permanent or seasonal waterbody.”

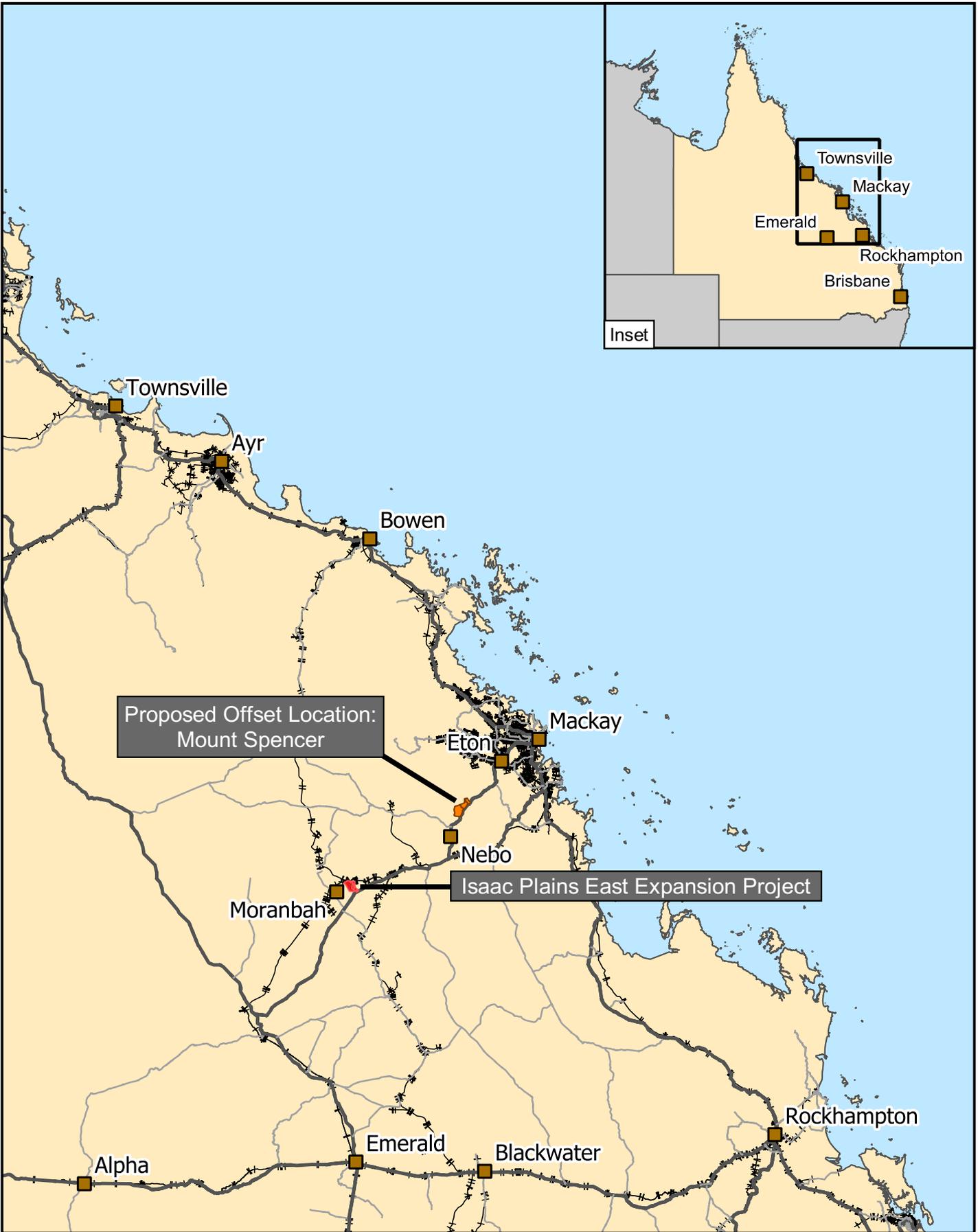


Figure 1: Mine and Proposed Offset Site Context

Legend

- Towns
- Isac Plains East
- Mount Spencer (Lot 4SP277438)
- Highways
- Roads
- Rail Network

0 30 60 km

Scale @ A3: 1 : 2500000
 Date: 19/10/2020
 Drawn: Josh T

DATA SOURCE
 BASE CONSULTING GROUP 2020;
 QSPATIAL 2020; The State of Queensland
 (Department of Natural Resource and
 Mines) 2020;



The responsible Department for the Approval was the Commonwealth Department of Environment and Energy (Department). The Department was renamed to the Department of Agriculture, Water and the Environment (DAWE) in early 2020. Further references in this report use the term “Department” to describe the Department or DAWE.

Extension of the Isaac Plains East Project is planned and approved under the EPBC Act (EPBC 2019/8548) separate to the Approval being the subject of this Report.

The action subject to the Approval officially commenced on the 9th of June 2018, subsequently this report is the third report and covers the period of the 9th of June 2020 to the 8th of June 2021.

The Approval relates to the EPBC Act Controlling Provisions:

- Listed threatened species and communities (sections 18 & 18A); and
- Water resources/trigger (sections 24D & 24E).

Specifically, the Approval addresses:

- Clearing of habitat for Koala (*Phascolarctos cinereus*), Squatter Pigeon (Southern) (*Geophaps scripta scripta*), Greater Glider (*Petauroides volans*) and Ornamental Snake (*Denisonia maculata*); and
- Monitoring of surface water, groundwater and riparian zone.

The Approval contains requirements for offsets under the EPBC Act Environmental Offsets Policy, including development of a Species Management Plan (SMP) outlining management and monitoring actions to minimise any impact to Listed threatened species under the EPBC Act. The Approval also requires development of an Offset Area Management Plan (OAMP).

1.2 Habitat Impacts and Offset area

Offset areas are required by the Approval to compensate for the habitat clearing required for the Isaac Plains East Project and include impacted habitat for the Koala (125 ha), Greater Glider (125 ha) and Squatter Pigeon (74 ha).

An initial OAMP (Base 2018) included suitable offset area. The initial proposed offset area identified was on Byrne Valley Station near Ayr in North Queensland. However, the negotiation process for securing this offset, undertaken during the period of previous Annual Compliance Reports, was unsuccessful. The Department was routinely engaged on the matter. Subsequent to the above, a variation to the Approval (14th of August 2020) was granted in order to allow sufficient time for securing the relevant offset in accordance with Condition 6 (see Section 1.1).

Negotiations to secure a new offset to address the above habitat impacts at Mt Spencer (approximately 23 km east of Nebo) were successfully completed within the period of this Annual Compliance Report. A new OAMP (BASE 2020) was developed to reflect Mt Spencer offset, signed by Stanmore and the Landholder prior to submission to the Department for approval. Approval of the OAMP was received on the 21st of May 2021. The OAMP includes offset areas for the separate Isaac Plains East Extension EPBC Approval (2019/8548) and the Isaac Downs Project EPBC Approval (2019/8413).

2 Audit Methods

The key site contact was Stanmore's, Senior Advisor – Health, Safety, Environment and Community (HSEC), Belinda Parfitt.

The Audit was conducted by SLR Principal Consultant, Paul Tett. Paul has in excess of 30 years' experience as an environmental professional associated with the mining and industrial sectors, including more than 11 years as a site based environmental practitioner, with the balance as a consultant focused primarily on mining and industrial projects. Paul is an experienced auditor having undertaken multiple compliance audits of mining and industrial operations. In addition, Paul has completed Environmental Management System (EMS) Auditor (ISO14001:2015) training, is a Member of the Australasian Institute of Mining and Metallurgy (AusIMM) and the Environment Institute of Australia and New Zealand (EIANZ). Paul is a Certified Environmental Practitioner (CEnvP) (Number 0638) and Queensland Commissioner for Declarations.

The audit was conducted through sourcing key site documents from Stanmore staff. The audit protocol was developed based on the conditions of the Approval and used as the primary basis for questioning and evidence gathering. Audit tables for the SMP and OAMP implementation are provided (Appendix A).

A site visit to the Isaac Plains Complex was undertaken by the auditor on the 13th of July 2021 during which interviews and evidence gathering were undertaken. A site inspection of the Isaac Plains East disturbance footprint was undertaken as part of the site visit.

The following staff were interviewed throughout the audit process:

- Belinda Parfitt - Stanmore Senior Advisor – Health, Safety, Environment and Community (HSEC);
- Brad Innes - Golding Specialist Mining Engineer;
- Leandro Pires - Stanmore General Manager Operations.

Selected photographs taken during the site visit are included in Appendix B.

Compliance status for each Approval Condition was determined in accordance with the rankings in Table 1.

Table 1: Audit Rankings

Rankings	Description
C - Compliant	Evidence and or actions completed, signifies compliance with the intent and/or requirement of the condition. Where applicable qualifying text is included.
NC – Non-Compliant	Evidence indicates that a specific requirement of the condition has not been met.
NA - Not Applicable	Requirement was not triggered within the period of the Annual Compliance Report, or the requirement was met prior to the reporting period.

2.1 Limitations

The Report reflects the audit findings based on preliminary questioning, visual inspections undertaken during the site visit, interview responses received during the site visit, follow up questioning post site visit and information contained in the verifying/supporting documentation provided.

2.2 Declaration of Accuracy

In making this declaration, I am aware that sections 490 and 491 of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.



Signed

Full name (please print) Paul Tett (BSc (AES), Member AusIMM, Member EIANZ, CEnvP (0638))

Position (please print) Principal Consultant (Environmental Assessment and Management)

Organisation (please print including ABN/ACN if applicable) SLR Consulting Australia Pty. Ltd. (ABN: 29 001 584 612)

Date 6th of September 2021

3 Key Findings and Recommendations

For the period of the Annual Compliance Report, Stanmore was compliant (as qualified) with all relevant conditions of the Approval.

There were 11 "Not Applicable" findings made during the audit.

No new environmental risks relative to the Approval were identified during the reporting period.

Staff interviewed throughout the audit process demonstrated an in depth understanding of the Approval requirements and the operational system controls required to ensure compliance with the conditions of the Approval. Management commitment to compliance with the Approval was evident.

Observations:

Condition 3 - Whilst one element of the SMP implementation was found to not have been undertaken during the reporting period (annual rehabilitation monitoring) this was not considered to contribute a material impact to the intent of the broader condition. It is noted that rehabilitation monitoring was completed during the week following the end of the reporting period. Therefore as substantial compliance was achieved a compliant finding is considered appropriate.

It is recommended that annual rehabilitation monitoring occur as per the SMP.

Note:

During the site visit an historic area of clearing outside the Approval boundary became evident. This clearing occurred on the 20th of September 2019. An internal investigation was undertaken (at the time) and corrective actions implemented. Notification of the incident to the Department was not undertaken within the timeframe of condition 18 of the Approval, however following the incident becoming evident as part of this audit, notification of the incident to the Department was initiated. Departmental response to the notification (DAWE 2021) affirmed no action was to be taken by the Department beyond a warning for contravention of conditions 1 and 18 of the Approval. As this incident occurred within the previous reporting period it is not considered a Non-Compliance in this Compliance Report. Further information is included (Section 4 (Table 2) Condition 1).

4 Detailed Findings

Table 2 details the findings of the audit relative to each Approval condition.

Table 2: Detailed Audit Findings

Condition Number	Condition	Findings	Compliance Status
	Conditions specific to the action		
	Clearance limits		
1	The approval holder must undertake the action within the Isaac Plains East Project Area.	During the period applicable to this Compliance Report the action had been undertaken in the Isaac Plains East Project area and within the Project Disturbance Boundary and Additional Disturbance (pipelines and roads) areas shown in Attachment A of the Approval. Weekly Mine Plans and Permits to Disturb were used as control mechanisms and included clear delineation of the Limit of Disturbance (LOD). In field inspection confirmed LOD markers were present.	C

Condition Number	Condition	Findings	Compliance Status
		<p><u>NOTE:</u> During the site visit an historic area of clearing outside the Approval boundary became evident. This clearing occurred on the 20th of September 2019. The unauthorised clearing was internally managed under a Permit to Disturb (#136) and was the result of a grader operator clearing on the eastern side of the limit of disturbance line instead of the western side (as per Permit to Disturb) of the line delineated with surveyed markers. The area cleared was the width of the grader and amounted to a total of ~ 1,700 m². The clearing occurred entirely within a pre cleared (of trees and shrubs) pasture area that was not identified in the Approval as habitat for any subject MNES. The clearing was in an area covered by the Isaac Plains East Extension EPBC Referral which was subsequently approved (EPBC 2019/8548) on the 4th of December 2020 including the area in the authorised disturbance footprint for that Approval. An internal investigation was undertaken and corrective actions implemented. Notification of the incident to the Department was not undertaken within the timeframe of condition 18 of the Approval, however following the incident becoming evident as part of this audit, notification of the incident to the Department was initiated. Departmental response to the notification (DAWE 2021) affirmed no action was to be taken by the Department beyond a warning for contravention of conditions 1 and 18 of the Approval. As this incident occurred within the previous reporting period it is not considered a Non-Compliance in this Compliance Report.</p> <p><u>Evidence:</u> Weekly Mine Plans 10th of January 2021, 20th of January 2021 and 3rd of February 2021, Disturbance Permit #160v3, field inspection, Approval EPBC 2019-8548, EA EPML00932713.</p> <p><u>NOTE Evidence:</u> DAWE Letter (DAWE 2021), Email B. Parfitt to EPBC Monitoring 28/07/2021 (inclusive of incident investigation and presentation),</p>	

Condition Number	Condition	Findings	Compliance Status
2	<p>The approval holder must not clear more than:</p> <ol style="list-style-type: none"> 125 hectares (ha) of habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>); 74 ha of Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat; and 1.4 ha of Ornamental Snake (<i>Denisonia maculata</i>) habitat. 	<p>Mapping of habitat clearing areas within the Approval boundary for each of the listed species was reviewed verified to remain as per the previous Compliance Report findings, as follows:</p> <ul style="list-style-type: none"> Koala and Greater Glider = 114.9 ha; Squatter Pigeon = 71.4 ha; and Ornamental Snake habitat = 0 ha <p>Habitat clearing areas remained within the approval constraints. Clearing permits and Weekly Mine Plans demonstrate control systems are applied to manage clearing locations and extents. Field inspection evidenced clearing limit delineation being flagging and pegging is in place.</p> <p><u>Evidence:</u> RE: IPCM EPBC Land Clearing email (R. Aspland 5th of March 2021), Weekly Mine Plans 10th of January 2021, 20th of January 2021 and 3rd of February 2021, Disturbance Permit #160v3, field inspection.</p>	C
	Species Management Plan		
3	<p>The approval holder must submit a Species Management Plan for the written approval of the Minister. The approved Species Management Plan must be implemented. The Species Management Plan must be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines and include:</p> <ol style="list-style-type: none"> measures that will be implemented to avoid, mitigate and manage impacts to EPBC Act listed threatened species and their habitat during vegetation clearance, construction, operation and decommissioning of the action; 	<p>A SMP was prepared by BASE Consulting Group (28th of September 2018). The SMP was submitted to the Department for written approval. Written approval for the SMP was given by the Department (letter dated the 2nd of October 2018). A second letter dated the 21st of November 2018 from the Department related to the SMP approval was issued correcting errors within the initial letter.</p> <p>Implementation of the SMP has substantially been undertaken in accordance with Table 7 of SMP as per Appendix A, with the exception of the annual rehabilitation monitoring event which was undertaken the week following the end of the Compliance Report period.</p>	C

Condition Number	Condition	Findings	Compliance Status
	<p>b. a program of monitoring and periodic evaluation of monitoring data to determine the effectiveness of management measures and inform adaptive implementation of the Species Management Plan for the duration of this approval; and</p> <p>c. details of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans.</p>	<p>The SMP was prepared by a suitably qualified person (A suitably qualified person is a person who has professional qualifications, training or skills and at least five (5) years of experience relevant to the nominated subject matters to give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods and/or literature.).</p> <p>The SMP was prepared in accordance with the Department's Environmental Management Plan Guidelines.</p> <p>Sections 4.0 and 4.7 of the SMP include measures to avoid, mitigate and manage impacts to threatened species and their habitat throughout all stages of the Project - (a).</p> <p>Section 5.0 of the SMP provides a program of monitoring and evaluation to assess effectiveness of the management measures – (b).</p> <p>Section 4.0 and 4.7 of the SMP provide details of how management measures relate to approved conservation advices, recovery plans and treat abatement plans – (c).</p> <p>The initial version of the SMP approved by the Department remains current.</p> <p><u>Observation:</u></p> <p>Whilst one element of the SMP implementation was found to not have been undertaken during the reporting period (annual rehabilitation monitoring) this was not considered to contribute a material impact to the intent of the broader condition. It is noted that rehabilitation monitoring was completed during the week following the end of the reporting period. Therefore as substantial compliance was achieved a compliant finding is considered appropriate.</p>	

Condition Number	Condition	Findings	Compliance Status
		<u>Evidence:</u> SMP, copy of letter dated the 21 st of November 2018 from the Department, CV of Dr Craig Streatfeild (suitably qualified person) who prepared the SMP, Email RE: RFI for Audit and Proposed Site Visit (Belinda Parfitt (Stanmore) to Paul Tett (SLR) confirmation of SMP version currency) and Department Environmental Management Plan Guidelines.	
4	The approval holder must not clear habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>) or Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat or Ornamental Snake (<i>Denisonia maculata</i>) habitat until the Minister has approved the Species Management Plan.	Not applicable to the period of this Annual Compliance Report – Found compliant in previous Annual Compliance Reports. <u>Evidence:</u> 21 st of November 2018 letter from Department to Stanmore Clarifying approval of OAMP as at 02 October 2018, Disturbance Permit 99, Disturbance Permit Register.	C
	Offset Management Plan		
5	The approval holder must submit an Offset Management Plan for the written approval of the Minister. The approved Offset Management Plan must be implemented. The Offset Management Plan must be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines and include: <ul style="list-style-type: none"> a. details of environmental offset/s to compensate for the habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>) and Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat to be cleared as identified in condition 2. b. details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act Environmental Offsets Policy; 	As discussed in Section 1.2, the initial OAMP became redundant during the previous Compliance reporting period. A new OAMP was prepared by BASE Consulting Group (19 th of November 2020), submitted to the Department and approved by the Department on the 21 st of May 2021. The new OAMP relates to the Mt Spencer Station Offset area. Offsets to address these requirements are now being pursued at Mt. Spencer (approximately 23 km east of Nebo). The Department was progressively informed of the circumstances surrounding the initial OAMP and development of the new OAMP. The OAMP was prepared by a suitably qualified person (A suitably qualified person is a person who has professional qualifications, training or skills and at least five (5) years of experience relevant to the nominated subject matters to give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods and/or literature.).	C

Condition Number	Condition	Findings	Compliance Status
	<ul style="list-style-type: none"> c. a field validation survey and baseline description of the current condition (prior to any management activities) of the offset area/s, including existing vegetation, for habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>) and Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat; d. a description and map (including shapefiles) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the offset attributes; e. information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors; f. a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s; g. a discussion of how proposed management measures take into account relevant approved conservation advices and are consistent with the measures contained in relevant recovery plans and threat abatement plans; h. completion criteria and performance targets for evaluating the effectiveness of Offset Management Plan implementation, and criteria for triggering corrective actions; i. a program to monitor, report on and review the effectiveness of the Offset Management Plan; j. a description of potential risks to the successful implementation of the offset/s, and contingency measures that would be implemented to mitigate against these risks; and k. details of the mechanism to legally secure the environmental offset/s. 	<p>The OAMP was prepared in accordance with the Department's Environmental Management Plan Guideline.</p> <p>Section 4.3 of the OAMP addresses details of the offsets to compensate for MNES species habitat clearing – (a).</p> <p>Section 4.7 of the OAMP addresses the requirements of the EPBC Act Environmental Offsets Policy – (b).</p> <p>Sections 3.0 and 4.0 and Appendices B, C and D of the OAMP detail the field validation baseline survey for offset areas – (c).</p> <p>Sections 1.2 and 3.2 and Figures 3 to 7 of the OAMP describe and map proposed offset areas – (d).</p> <p>Section 4.3 of the OAMP provides information on habitat connectivity of the proposed offset areas relative to other habitat and corridors – (e).</p> <p>Sections 5.0 and 6.0 of the OAMP describe management measures to be implemented in offset areas – (f).</p> <p>Sections 4.0 and 5.0 of the OAMP discuss how management measures account for relevant approved conservation advices and are consistent with recovery plans and treat abatement plans – (g).</p> <p>Section 5.1 of the OAMP addresses completion criteria and performance targets for evaluating effectiveness of the OAMP implementation or triggering corrective actions – (h).</p> <p>Section 7.0 and 8.0 of the OAMP discuss monitoring and reporting to review OAMP effectiveness – (i).</p> <p>Sections 8.0 and 9.0 of the OAMP describes risks to the OAMP implementation and contingency measures to mitigate risks – (j).</p> <p>Sections 4.6 and 8.3 of the OAMP provides details of mechanisms for legally securing offsets – (k).</p>	

Condition Number	Condition	Findings	Compliance Status
		<p>Appendix A addresses compliance with the monitoring requirements of the OAMP (Table 20 of the OAMP)</p> <p>It is considered that Stanmore are compliant with this condition.</p> <p><u>Evidence:</u> OAMP, copy of letter dated 21st of November 2018 from the Department (DAWE 2021b), CV of Dr Craig Streatfeild (suitably qualified person) who prepared the OAMP, Department Environmental Management Plan Guidelines, Offsets Email (Richard Oldham 3rd of February 2021), Letter from Department approving the OAMP.</p>	
6	The approval holder must legally secure the environmental offset/s within two (3) years from the commencement of the clearance of habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>) and Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat.	<p>Not applicable to the period of this report. Three years from commencement of clearing (the action) would be the 25th of October 2021 (Date of Commencement for Fauna Capture Records - AusEcology).</p> <p><u>Evidence:</u> Fauna Capture records 25th of October 2018 to the 17th of January 2019.</p>	NA
7	The approval holder must not clear habitat suitable for the Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) and Greater Glider (<i>Petauroides volans</i>) and Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat until the Minister has approved the Offset Management Plan.	<p>Not applicable to the period of this Annual Compliance Report – Found compliant in previous Annual Compliance Reports.</p> <p><u>Evidence:</u> 21st of November 2018 letter from Department to Stanmore Clarifying approval of OAMP as at 02 October 2018, Disturbance Permit 99, Disturbance Permit Register.</p>	C
	Surface water management		

Condition Number	Condition	Findings	Compliance Status
8	<p>In addition to the surface water quality monitoring requirements of the Environmental Authority issued for the action under the Environmental Protection Act 1994 (Old) (EP Act), the approval holder must construct, operate and monitor an additional surface water quality monitoring point at the Isaac River above the confluence with Smoky Creek prior to commencement of the action.</p>	<p>A water quality monitoring point has been installed at the Isaac River above Smoky Creek.</p> <p>Initial installation and commissioning was completed during April 2018 prior to official commencement of the action (9th of June 2018). The surface water quality monitoring point was visited during the site visit, maintenance logs reviewed and equipment inspected. The monitoring point was operated and monitored in accordance with manufacturers specifications throughout the reporting period.</p> <p><u>Evidence:</u> Environmental Authority (EA) for the site, Email correspondence 7th of May 2019 from Melanie Ballantine (Stanmore) to Chris Oats (Department Compliance Monitoring Team), Confirmation email from Melanie Ballantine to the Auditor 17th of July 2019, February 2021 field inspection by Auditor, Quarterly Data Summary Reports for the reporting period(ALS).</p>	C
	Groundwater monitoring and management		
9	<p>The approval holder must publish annual groundwater monitoring data, required to be collected by the Environmental Authority for the action under the EP Act, in the Annual Compliance Report required under condition 17.</p>	<p>The relevant versions of the EA took effect on the 6th of June 2019 and as amended 26th of February 2020 (relevant to the entire period of this Compliance Report) and 16th of June 2021 (not applicable to the period of this Compliance Report).</p> <p>Condition C42 of the relevant EA (C43 of initial version) requires development of a Groundwater Management and Monitoring Program – Previous Compliance Reports state” A Groundwater Management and Monitoring Program was developed in accordance with C42 (C43 of previous version) and provided to DES on the 29 June 2018.”</p>	C

Condition Number	Condition	Findings	Compliance Status
		<p>Condition C43 of the relevant EA (C44 of the initial version) requires collection and annual review of monitoring data (by an appropriately qualified person) in accordance with the EA condition. The annual review applicable to the period of this report was the C&R 2020 Annual Groundwater Review which includes data between May 2019 and December 2020 (18 Months) (Appendix C). Further raw groundwater analysis data for January/ February 2021 and April 2021 are included (Appendix D) to address the balance of data for the reporting period required to be published.</p> <p>C&R Consulting prepared the equivalent monitoring data report for the period applicable to the previous Annual Compliance Report and the consultant was found to be suitably qualified. (A suitably qualified person is a person who has professional qualifications, training or skills and at least five (5) years of experience relevant to the nominated subject matters to give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods and/or literature.)</p> <p>ALS Environmental are a National Association of Testing Authorities (NATA) accredited laboratory for the analysis undertaken.</p> <p>Condition C44 of the relevant EA (C45 of the initial version) prescribes the groundwater monitoring locations, frequencies and parameters. The Groundwater Management and Monitoring Program addresses these requirements.</p> <p>The Annual Groundwater Review applicable to the previous Annual Compliance Report (Appendix C of this report) was published with the 2019/2020 Annual Compliance Report as it addressed the full period of that Compliance Report.</p>	

Condition Number	Condition	Findings	Compliance Status
		<p><u>Evidence:</u> Applicable EAs, Raw groundwater data for the Report period (ALS Environmental) and C&R Consulting Annual Groundwater review 2019, Annual Groundwater Review, 2020 Annual Groundwater Review (May 2021 – Appendix C).</p>	
	Riparian zone monitoring		
10	<p>Prior to the commencement of mining activities, a suitably qualified person must undertake ecological surveys in accordance with the Department's survey guidelines to determine the extent (in hectares) and habitat condition for EPBC Act listed threatened species in the riparian area. The approval holder must report its findings in the first Annual Compliance Report required under condition 17.</p>	<p>Ecological surveys were undertaken in April (17th to 20th) 2018 by Ecological Survey and Management (EcoSM) to determine the extent and habitat condition for EPBC Act Listed threatened species within the riparian area. A specific report addressing the extent and condition of the riparian habitat relative to the EPBC Act listed threatened species was produced, Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018. The report was included as Appendix D in the first Annual Compliance Report.</p> <p>The ecological surveys predated the commencement of action notification date (9th of June 2018).</p> <p>Previous Annual Compliance Reports found that the ecological survey was completed by a suitably qualified person (A suitably qualified person is a person who has professional qualifications, training or skills and at least five (5) years of experience relevant to the nominated subject matters to give authoritative assessment, advice and analysis about performance relevant to the subject matter using relevant protocols, standards, methods and/or literature.).</p> <p><u>Evidence:</u> Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018, first Annual Compliance Report (August 2019).</p>	C

Condition Number	Condition	Findings	Compliance Status
11	For the duration of this approval, the approval holder must maintain the extent and habitat condition for EPBC Act listed threatened species in the riparian area, as determined by the ecological surveys required under condition 10.	<p>The proposed monitoring regime nominated in the Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018 will be implemented to monitor habitat condition against the baseline established. The monitoring frequency proposed is every two years, with the first monitoring event due late in 2020 and completed in early March 2021. Despite a lag in completion of riparian monitoring beyond the target date, a Compliant finding is appropriate as seasonal conditions should be considered for like\ like comparison (baseline monitoring conducted in April 2018).</p> <p>The 2021 monitoring found “For all four species there is no significant difference between the habitat quality scores returned and 2018 and the current assessment.”, (EcoSM 2021).</p> <p><u>Evidence:</u> Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018, Email B .Parfitt to P. Tett 7th of June 2021, Riparian Monitoring Report June 2021.</p>	C
12	If it is determined that the habitat condition for EPBC Act listed threatened species in the riparian area has not been maintained, the approval holder must notify the Department within one (1) month of determining that the habitat condition has not been maintained.	<p>Not Triggered as 2021 monitoring found no significant difference between the habitat quality scores in the 2018 Baseline and the March 2021 assessment.</p> <p><u>Evidence:</u> Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018, Email B. Parfitt to P. Tett 7th of June 2021, Riparian Monitoring Report Feb 2021.</p>	NA

Condition Number	Condition	Findings	Compliance Status
13	<p>Within 12 months of notification in accordance with condition 12, the approval holder must submit an Offset Management Plan for the written approval of the Minister. The approved Offset Management Plan must be implemented. The Offset Management Plan must be prepared by a suitably qualified person in accordance with the Department's Environmental Management Plan Guidelines and include:</p> <ul style="list-style-type: none"> a. details of the environmental offset/s to compensate for the extent and habitat condition for EPBC Act listed threatened species in the riparian area not maintained as required under condition 11; b. details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act Environmental Offsets Policy; and c. details of the mechanism to legally secure the environmental offset/s. 	<p>Not Triggered as Condition 12 has also not been triggered.</p> <p><u>Evidence:</u> Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018, Email B. Parfitt to P. Tett 7th of June 2021, Riparian Monitoring Report Feb 2021.</p>	NA
14	<p>The approval holder must legally secure the environmental offset/s within two (2) years from the date that the Department was notified in accordance with condition 12.</p>	<p>Not Triggered as Condition 12 has also not been triggered.</p> <p><u>Evidence:</u> Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018, Email B. Parfitt to P. Tett 7th of June 2021, Riparian Monitoring Report Feb 2021.</p>	NA
	Standard administrative conditions		
	Notification of date of commencement of the action		
15	<p>Within 20 days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement.</p>	<p>The commencement date of the action (9th of June 2018) was notified to the Department on the 27th of May 2018.</p>	C

Condition Number	Condition	Findings	Compliance Status
		<p><u>Evidence</u> : Action commencement notification Email 27 May 2018 from Richard Oldham (Stanmore) to postapproval@environmenta.gov.au. and 27 June 2018, letter from the Department to Richard Oldham (Stanmore) acknowledging commencement date.</p>	
16	<p>The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement management plans required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Department's website. The results of audits may also be publicised through the general media.</p>	<p>Evidence was sighted of commencement correspondence, Disturbance Permits, Spotter catcher and fauna inspection records, OAMP and SMP actions (Appendix A), water quality records, monitoring equipment maintenance records, dust monitoring records.</p> <p>It is understood that no records were requested by Department officers during the period of this report.</p> <p><u>Evidence</u>: Action commencement notification, Disturbance Permits, Offset Management Plan and Species Management Plan implementation records, records of monitoring equipment maintenance, machinery inspection and weed hygiene records, dust monitoring records, nest box inspection records, Spotter Catcher Records.</p>	C
17	<p>Within three (3) months of every 12 month anniversary of the commencement of the action, the approval holder must publish a report (the Annual Compliance Report) on its website addressing compliance with each of the conditions of this approval, during the previous 12 months. Documentary evidence providing proof of the date of publication must be provided to the Department at the same time as the Annual Compliance Report is published. Reports must remain published for the life of the approval. The approval holder must continue to publish the Annual Compliance Report each year until such time as agreed to in writing by the Minister.</p>	<p>This report was prepared and will be published to the Stanmore Website within the timeframe applicable to this condition (by 9th of September 2021).</p> <p>Notification will be provided to the Department confirming upload of this report to Stanmore Website.</p>	C (Pending)

Condition Number	Condition	Findings	Compliance Status
		<p>The previous Annual Compliance Report for the period was located on the Stanmore Web Site (https://stanmorecoal.com.au/environment-management) and dated 25th of May 2021. The report was published outside the three month requirement (9th of September 2020). Email correspondence between Leandro Pires (Stanmore) and the Department relative to the delay in the Annual Compliance Report was evidenced with the Department noting “..no further action will be taken by the Department on this matter”. Email from B. Parfitt (Stanmore) to P. Tett (SLR) confirmed 2019/2020 report publication to the Stanmore website and notification of such to the Department (7/6/2021).</p> <p>It is noted that Non-Compliance was found with Condition 17 in the 2019/2020 report as a result of the above.</p> <p><u>Evidence:</u> This Report, Pending upload to Stanmore Website and notification to the Department, Previous Annual Report published to the Stanmore Web Site, Email to the Department regarding previous Annual Compliance Report Delay, Email confirming publishing and Department notification of 2019/2020 report.</p>	
18	<p>The approval holder must report any potential or actual contravention of the conditions of this approval to the Department in writing within five (5) business days of the approval holder becoming aware of a contravention.</p>	<p>Relative to the period of this Compliance Report no potential or actual contravention of conditions was found.</p> <p><u>NOTE:</u> Unreported historic contravention of conditions 1 and 18 for the period of the previous Compliance Report (2019/2020) became evident during the audit process for this Compliance Report, see condition 1 <u>NOTE</u>.</p> <p><u>Evidence:</u> This Report.</p>	C

Condition Number	Condition	Findings	Compliance Status
19	Upon the direction of the Minister, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The approval holder must not commence the audit until the Minister approves the independent auditor and audit criteria in writing. The audit report must address the criteria to the satisfaction of the Minister.	No such direction has been received from the Minister. <u>Evidence:</u> Verbal (Belinda Parfitt and Richard Oldham).	NA
20	The approval holder may choose to revise a management plan approved by the Minister under condition 3 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. If the approval holder makes this choice it must: <ol style="list-style-type: none"> a. notify the Department in writing that the approved plan has been revised and provide the Department, at least four (4) weeks before implementing the revised plan, with: <ol style="list-style-type: none"> i. an electronic copy of the revised plan; ii. an explanation of the differences between the revised plan and the approved plan; and iii. reasons the approval holder considers that the taking of the action in accordance with the revised plan would not be likely to have a new or increased impact. 	Not Triggered as: <ul style="list-style-type: none"> • The SMP has not been revised since approval by the Department on the 2nd of October 2018. • The initial approved OAMP was replaced due to a change to offset location and the new OAMP was Approved by the Minister on the 21st of May 2021. <u>Evidence:</u> SMP, OAMP, copy of the letter dated 21 st of November 2018 from the Department, Letter from Department approving the OAMP, Verbal (Belinda Parfitt).	NA
20A	The approval holder may revoke its choice under condition 20 at any time by notice to the Department. If the approval holder revokes the choice to implement a revised plan, without approval under section 143A of the EPBC Act, the plan approved by the Minister must be implemented.	Not Triggered as Condition 20 has also not been triggered. <u>Evidence:</u> SMP, OAMP, copy of the letter dated 21 st of November 2018 from the Department, Letter from Department approving the OAMP, Verbal (Belinda Parfitt).	NA
20B	If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the revised plan would be likely to have a new or increased impact, then:	Not Triggered as Condition 20 has also not been triggered.	NA

Condition Number	Condition	Findings	Compliance Status
	<p>a. condition 20 does not apply, or ceases to apply, in relation to the revised plan; and</p> <p>b. the approval holder must implement the plan approved by the Minister.</p> <p>To avoid any doubt, this condition does not affect any operation of conditions 20 and 20A in the period before the day the notice is given. At the time of giving the notice, the Minister may also notify that for a specified period of time condition 20 does not apply for one or more specified plans required under the approval.</p>	<p><u>Evidence:</u> SMP, OAMP, copy of the letter dated 21st of November 2018 from the Department, Letter from Department approving the OAMP, Verbal (Belinda Parfitt).</p>	
20C	<p>Conditions 20, 20A and 20B are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan to the Minister for approval.</p>	<p>Not Triggered as the SMP and OAMP have not been revised since approval by the Department on the 2nd of October 2018.</p> <p><u>Evidence:</u> SMP, OAMP, copy of the letter dated 21st of November 2018 from the Department, Letter from Department approving the OAMP, Verbal (Belinda Parfitt).</p>	NA
21	<p>If, at any time after five (5) years from the date of this approval, the approval holder has not commenced the action, then the approval holder must not commence the action without the written agreement of the Minister.</p>	<p>Not Triggered as the action has commenced and is within 5 years of the date of approval.</p> <p><u>Evidence:</u> The Approval and action commencement notification Email 27th of May 2018 from Richard Oldham (Stanmore) to postapproval@environmenta.gov.au. and 27th of June 2018, letter from the Department to Richard Oldham (Stanmore) acknowledging commencement date.</p>	NA

Condition Number	Condition	Findings	Compliance Status
22	<p>Unless otherwise agreed to in writing by the Minister, the approval holder must publish all management plans referred to in these conditions of approval on its website. Each management plan must be published on the website within one (1) month of being approved by the Minister or being submitted under condition 20. All management plans must remain on the website for the lifetime of the approval unless otherwise agreed to in writing by the Minister.</p>	<p>The SMP and OAMP have been published on the Stanmore website (https://stanmorecoal.com.au/environment-management), and the link dated 28th of September 2018 (SMP) and 19th of November 2020 (OAMP).</p> <p>The SMP was approved outside the period of this Annual Compliance Report. (<u>Note</u>: The current SMP was published as at the 20th of August 2021).</p> <p>The OAMP was approved during the period of this Compliance Report, however the publishing date is relevant to the next Annual Compliance Report period. (<u>Note</u>: The current OAMP was published as at the 20th of August 2021).</p> <p><u>Evidence</u>: Stanmore website (accessed 20th of August 2021).</p>	C (SMP) and NA (OAMP)

5 Reviewed Documentation

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Stanmore IP Coal Pty Ltd, July 2020. Threatened Species Live Here Signs.

Stanmore IP Coal Pty Ltd, September 2019. Rehabilitation Management Plan.

Stanmore IP Coal Pty Ltd. Up to Date Disturbance Permit Register. Sighted during site visit on the 3rd of February 2021.

WRM Water and Environment Pty Ltd, 13th of May 2019. Isaac Plains Complex Water Management Plan Review 2019.

WRM Water and Environment Pty Ltd, 23rd of March 2018. Isaac Plains Complex Water Management Plan.

APPENDIX A

Species Management Plan and Offset Management Plan Implementation– Audit Tables

Species Management Plan and Offset Management Plan Implementation– Audit Tables

BP = Belinda Parfitt - Senior Advisor – Health, Safety, Environment and Community (HSEC).

Species Management Plan - Table 7. Measures to avoid/mitigate impacts to EPBC Act listed threatened fauna

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
Limit or avoid loss of MNES and/or habitat for MNES.	<ul style="list-style-type: none"> Clearing of habitat for MNES does not occur outside of the approved disturbance limits and does not exceed the disturbance limits detailed in Table 1 of this SMP. No net loss of habitat for the Koala and Greater Glider outside of the approved disturbance limits. No loss of permanent water sources for the Squatter Pigeon outside of the approved disturbance limits. Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan. 	<ul style="list-style-type: none"> Infrastructure will be sited in accordance with the State and Commonwealth approval conditions. Areas requiring vegetation removal will be clearly delineated to ensure disturbance to areas being retained is avoided. Limits of clearing are to be delineated using barricading or temporary fencing and signage prior to works commencing. Exclusion areas are to be clearly shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. Where exclusion fencing is required, consideration shall be given to fauna movement, current land uses and worker safety requirements. Permanent water sources for retention such as farm dams outside of the disturbance limits will be clearly delineated and shown and labelled on all operational and management drawings and plans Avoid where possible and within the constraints of the mining schedule, impacting on MNES habitat during breeding periods through timing of clearing and creek disturbance activities to avoid the main breeding season of impacted MNES (i.e. mid dry season to wet season for Squatter Pigeon). Prior to entry to the Project area, all site personnel including contractors shall be made aware via toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction works being undertaken in or adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of SMP relevant fauna in the activity area to the EO immediately. An internal 'Permit to Disturb' system will be used by the EO to ensure that all clearing activities are authorised prior to disturbance. Conditions listed in the Permit to Disturb must be implemented. The EO or delegate will routinely inspect the disturbance limit boundaries to ensure that no clearing or disturbance of vegetation or habitat beyond the approved limits has taken place. Temporary stockpile sites for soil and equipment, access routes, laydown areas and other associated infrastructure will 	<ul style="list-style-type: none"> Clearing of MNES habitat exceeds the approved disturbance limits in Table 1 of this SMP and/or occurs outside of the Project footprint as outlined in Attachment A of EPBC Act approval. No disturbance to permanent water sources, which may provide habitat for Squatter Pigeons and Ornamental Snakes, outside of the disturbance areas. Rehabilitation and decommissioning fails to meet the objectives of the Rehabilitation Management Plan. 	<ul style="list-style-type: none"> Fauna Spotter will monitor and record clearing activities and all fauna encountered. The Environmental Officer (EO) will monitor and record the total area of MNES habitat cleared every quarter and assess against the disturbance limits outlined in Table 1 of this SMP and the Project footprint as outlined in EPBC Act approval. Auditing of the Permit to Disturb will be undertaken quarterly by the EO to ensure any disturbance has been undertaken in accordance with the requirements of the Permit to Disturb, this SMP and approval conditions and to ensure no unauthorised disturbance has occurred. Rehabilitation monitoring will be undertaken in accordance with Rehabilitation Monitoring Plan that is required to be prepared in accordance with Condition F13 of the Project's EA (Appendix C). 	<ul style="list-style-type: none"> Should clearing of habitat for MNES exceeds the approved disturbance limits in Table 1 of this SMP and/or occurs outside of the Project footprint, clearing, works are to cease immediately and DotEE notified of the incident within five business days. The incident will be recorded in the Project's environmental and incident reporting system register. Following clearing, the area will be assessed within 20 business days by a suitably qualified expert with corrective actions provided to the DotEE via a Corrective Action Contingency Plan. The Plan will include a schedule to implement the corrective actions. Should rehabilitation and decommissioning fail to meet the objectives and completion criteria of the Rehabilitation Management Plan and the schedule outlined in Table 19 of the Project's EA, the reasons of the failure will be investigated. <p>Corrective Actions:</p> <ul style="list-style-type: none"> The Corrective Actions identified in the Corrective Action Contingency Plan and approved by DotEE will be implemented and may include additional 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <ul style="list-style-type: none"> Infrastructure as per approvals. (Field observations). Permits to Disturb prepared and signed off prior to clearing. Mine Planners, Supervisors and Spotter Catchers sign on to the permits. Clear delineation of clearing boundaries in field evident. Post clearing field inspections are undertaken by BP to ensure permit requirements are observed and entered in the Disturbance Permit Register. (BP, Register Sighted on site). Requirements SMP and OAMP addressed in the Permits to Disturb. (Permits to Disturb, Disturbance Permit Register). Surveying, Pegging and Flagging of the clearing limits addressed in the Permits to Disturb. Disturbance surveying (including MNES Habitat) is undertaken routinely and GIS files used by the site Senior Advisor HSEC to track clearing as and when required. This is reported internally monthly. (BP, Field, Survey Records and Photos (including BP post clearing inspection photos in Appendix B as supplied)). GIS files prepared and viewed. Limit of disturbance clearly delineated. (Field, Golding Mine Plans (BI)). Limit of disturbance shown on Operational Drawings, dams defined in Water Management Plan. (Operational Drawings, Permits to Disturb, Current Water Management Plan and Review 2019). Barbed wire fencing retained in place where possible, Fencing lower strand located up higher than standard property fencing reduces impact to fauna movement, pegging delineation, bunting and signing used to define no

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
		<p>be located in cleared areas and will not be situated in areas of MNES habitat.</p> <ul style="list-style-type: none"> • Prior to construction activities commencing, signage, including speed limits, will be erected in the vicinity of exclusion areas to warn of the potential presence of threatened fauna in the area. • Pre-clearance surveys will be undertaken by a suitably qualified ecologist using approved State and Commonwealth survey guidelines within 48 hours before clearing activities commencing. • The pre-clearance survey will be undertaken in order to: <ul style="list-style-type: none"> • Record the location of all hollow bearing trees, log piles and nest using a GPS. Features of tree hollows (diameter, number and whether active/inactive) should be recorded in the Environmental Diary/Register; and • Relocate all captured non-breeding animals to suitable habitat adjacent to the disturbance area and within the Project Area. • A Fauna Spotter will be present for all clearing activities and will conduct a walk-through survey prior to commencement of clearing and prior to clearing works each day to check vegetation and other fauna habitats. • The Fauna Spotter will reinspect the area of cleared vegetation immediately after clearing to locate any potentially injured fauna that should then be taken to a wildlife carer or veterinarian. • Vegetation clearing will be undertaken progressively and trees will be felled in the direction of the clearance zone to avoid impacts to adjoining retained vegetation and habitat. • Hollow bearing trees will be clearly flagged and surrounding vegetation removed with the hollow bearing tree left standing for at least one night to encourage fauna to relocate of its own accord. Hollow bearing trees will be inspected to determine if hollows are occupied. • If after one night the resident fauna have not moved on, the hollow entrance will be blocked with a towel or similar and the hollow removed by cutting below the hollow section. The hollow with the animal inside will then be installed in nearby similar and adjoining vegetation to be retained at a similar height and orientation with the entrance unblocked at dusk. • If the procedure described above is not possible for any reason, hollow-bearing trees will be felled using a tree grab or similar that can remove the tree in a controlled fashion. If possible and safe to do so, hollow trees will be felled at dusk to allow fauna the opportunity to disperse during their normal activity period. These trees will be felled away from hollow openings. The tree will be knocked at the base several times 			<p>rehabilitation or offsets or provision of additional permanent water sources for the Squatter Pigeon and/or Ornamental Snake prey.</p> <ul style="list-style-type: none"> • Within 20 business days of a rehabilitation trigger being activated, a Contingency Plan will be developed by a suitably qualified expert to address the reason for the failure and identify appropriate Corrective Actions. 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <p>go areas and clearing limits. (Field, Disturbance Permits)</p> <ul style="list-style-type: none"> • Water infrastructure retention agreement and plan in place. (Retention of Infrastructure Agreement). • Timing of disturbance was generally outside breeding (Mid Dry to Wet) season for Squatter Pigeon. (Disturbance Permits, Disturbance Permit Register). • The Environment and Community - Training Induction Package includes MNES considerations and injured fauna reporting. Information Sheets / Posters are routinely located in common gathering areas, including office areas such as the Technical Services Alerts Board. These posters are specifically distributed as clearing campaigns are initiated. (HSEC Training Package, Information Posters, Green Guidelines Signs, Site Environmental Briefs). • Permit to disturb system in use. (Disturbance Permits, Disturbance Permit Register). • Spotter /catcher / Ecologist and (Clearing Contractor) attends site pre clearing (24- 48 hours) and remains on site during clearing, they are provided with the GIS clearing boundaries and direct the clearing machinery. Boundaries are pegged and bunted. The Site Senior Advisor HSEC is routinely moving around the mine site and observes the cleared areas as a matter of course. (EcoSM Spotter catcher letter reports Jan and Feb 2021). • Stockpiles are located outside of MNES habitat areas. (Disturbance Permits, Field). • The maximum site speed limit is 60 km\hr and signage is located throughout the site. (Field). • Pre clearance surveys undertaken by qualified ecologist (EcoSM) prior to and concurrent with clearing. During Jan and Feb 2021 EcoSM Ecologist attended site (IPEE) to undertake the pre-clearing

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
		<p>prior to felling to encourage fauna to relocate of their own accord. Once the tree is felled, it will be inspected for any fauna and any injured fauna rescued and taken to a wildlife carer or veterinarian.</p> <ul style="list-style-type: none"> Any fauna that is captured will be relocated into the adjacent habitat at least 200 m from the clearing area if clearing works are yet to be completed. Where threatened fauna is identified and delaying the clearing of area is not feasible, (i.e. the clearing is critical to the activity schedule), a 50 m exclusion zone will be established and the area must not be disturbed for a minimum of 24 hours while clearing is undertaken around the exclusion zone. After 24 hours, a Fauna Spotter/Catcher may relocate the breeding animal to suitable habitat at least 200 m away from the disturbance area. Where survival of young or eggs is unlikely as a result of the disturbance, these are to be handed over to a previously identified wildlife carer or veterinarian. 				<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <p>survey. (EcoSM Spotter catcher letter reports Jan and Feb 2021).</p> <ul style="list-style-type: none"> Hollow bearing tree locations, log piles and nests have been recorded . (Appendix A of EcoSM Spotter catcher letter report 8th of April 2020, Fauna Capture Records). Animals were captured and relocated (and recorded) as required by Spotter catchers during clearing activities. (EcoSM Spotter catcher letter reports Jan and Feb 2021). Spotter catchers undertook pre and post-clearing inspections. (EcoSM Spotter catcher letter reports Jan and Feb 2021). Injured wildlife was directed to carers as required and record noted in Fauna Register (EcoSM Spotter catcher letter reports Jan and Feb 2021). Records show progressive clearing away from undisturbed habitat where possible. (Disturbance Permits, EcoSM Spotter catcher letter report 8th of April 2020, EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records, Field). Hollow bearing trees were flagged surrounding vegetation cleared and the tree left to stand overnight and inspected by the spotter catcher next day and any resident fauna relocated where possible prior to – felling in accordance with requirements. (Disturbance Permits, EcoSM Spotter catcher letter report 8th of April 2020, EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records). Pre clearing inspections to identify hollow bearing trees. (Disturbance Permits, EcoSM Spotter catcher letter report 8th of April 2020, EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records). Fauna was relocated a minimum of 200 m away from clearing activities and locations recorded in the Fauna Capture Records. (EcoSM Spotter catcher letter

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						<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <p>report 8th of April 2020, EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records).</p> <ul style="list-style-type: none"> No threatened fauna were identified during habitat clearing activities (outside the Approval boundaries). (EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records). It is noted that the monitoring column states “Rehabilitation monitoring will be undertaken in accordance with Rehabilitation Monitoring Plan that is required to be prepared in accordance with Condition F13 of the Project’s EA (Appendix C).” The Rehabilitation Monitoring Program (C&R June 2018) and Rehabilitation Management Plan (Stanmore September 2019) reference Condition F13 of the EA and indicate annual monitoring will take place. Monitoring (C&R January 2019). No Rehabilitation Inspection was undertaken during the reporting period. The Auditor notes that rehabilitation monitoring had been undertaken during June 2021 (Rehabilitation Monitoring Report [2021] – Draft, July 2021 - C&R Consulting) in the week following the end of the Compliance Report period.
Prevent habitat degradation and a decline in habitat values within the retained habitat within the Project area.	Maintain habitat quality scores within the retained MNES habitat in relation to baseline habitat quality scores.	<ul style="list-style-type: none"> Areas of MNES habitat adjacent to the disturbance footprint and within the Project area (i.e. mine lease), will be clearly delineated and shown and labelled on all operational and management drawings and plans. GIS shapefiles will be provided to clearing personnel and/or contractors prior to the commencement of clearing operations. Site access is only to occur along designated site access tracks. No unauthorised access is permitted. Prior to commencement of the action signage, including speed limits, will be erected to warn of the potential presence of threatened fauna in the area. Posters will be developed and displayed in meeting areas that reminds staff and contractors about the MNES present in the Project area. Prior to entry to the Project area, all site personnel including contractors shall be made aware via toolbox talks and site information sheets, of the sensitive environs they will be working in and around and be advised of specific limitations to construction and/or operational works being undertaken in or 	The habitat quality score in areas of retained MNES are not maintained (e.g. habitat falls below the baseline habitat quality score).	<ul style="list-style-type: none"> Habitat quality assessments will be undertaken annually for the first three (3) years then every two (2) years thereafter in retained vegetation that provides habitat for MNES including monitoring of the riparian area as required by Condition 10 of the EPBC Act approval. Monitoring will be undertaken in accordance with the Commonwealth survey guidelines and the State guidelines guide for determining terrestrial habitat quality. These methods are outlined in 	<ul style="list-style-type: none"> Where inadvertent disturbance to MNES habitat occurs, an investigation will be undertaken. Should a decline in the habitat quality scores be observed, the cause will be investigated, and a Corrective Actions Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the decline being detected. The Plan will include appropriate corrective actions and an implementation schedule for those actions. The 	<ul style="list-style-type: none"> Mine planning and Disturbance Permits files showing limits of disturbance and no go areas were prepared and provided to clearing contractors and spotter catchers. (Disturbance Permits, Golding mine planning design). Induction (sighted during site visit) address designated tracks and roads. Induction and HSEC Training Package address the requirement for Disturbance Permits for development of new tracks or other disturbance. (HSEC Training Package). The maximum site speed limit is 60 km\hr and signage is located throughout the site. (Field). Information Sheets / Environmental Briefs are routinely located in common gathering areas, including office areas.

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
		<p>adjacent to threatened fauna habitat. All staff and contractors will be required to report sightings of MNES fauna to the EO immediately</p> <ul style="list-style-type: none"> • Where tree hollows that are suspected as being used by Greater Gliders are identified from within the disturbance area, they are to be salvaged to the greatest extent possible and relocated within retained vegetation. As far as practical, the site of the relocation is to be within retained vegetation and replicate the height and orientation of the original breeding or nesting structure. Sections of hollow branch or log will be secured in the new location by mechanical means deemed appropriate by the Fauna Spotter/Catcher (e.g. bolts, metal bands). Relocation is to be undertaken under the supervision of a spotter/catcher. • Selected trees and/or logs will be salvaged and reused as fauna habitat to enhance retained vegetation habitat values (e.g. within Smoky Creek and Billy's Gully). Trees and other habitat features to be salvaged will be identified and flagged by the Fauna Spotter/Catcher during the walk-through survey and/or clearance activities. • If an occupied tree hollow cannot be relocated the breeding habitat should be replaced nearby and in retained vegetation (but at least 200 m away from the disturbance area) in undisturbed habitat, with an artificial nesting structure at a ratio of 1:1 using current best practice nest box design. • Implementation of dust suppression techniques in accordance with the Dust Management Plan and the CMSHA and the CMSHR. • Maintenance of existing fences. • Pest animals and weeds will be managed in accordance with the Project's Weed and Pest Management Plan. • Light spill we be directed to the open cut pits to minimise light spill. • The use of low wattage lighting with list spill guards. 		Appendix A and Appendix B.	<p>DotEE will be notified within 20 business days of the decline in habitat quality.</p> <p>Corrective Actions:</p> <ul style="list-style-type: none"> • Corrective actions identified in the Plan will be implemented within 30 days of the trigger being detected. Depending on the cause of the decline in habitat quality scores, potential corrective actions may include: <ul style="list-style-type: none"> ○ Rehabilitation of MNES habitat. ○ Additional environmental awareness training to workers regarding MNES. ○ Increasing pest animal and weed control measures or revising the type of measures implemented. ○ Increasing the frequency of dust suppression techniques. ○ Repair fences if damaged, or installation of new fencing. • Provision of additional offsets in accordance with the EPBC Act approval Condition 13. 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <p>These are specifically distributed as clearing campaigns are initiated. Custom bench seats have been constructed showing the MNES Species and are distributed around the administration and shift change bus stop areas (Information Posters, Green Guidelines Signs, Site Environmental Briefs).</p> <ul style="list-style-type: none"> • The HSEC Training Package includes MNES considerations and injured fauna reporting. (HSEC Training Package). • To date no hollow trees associated with Greater Gliders have been recorded. (BP, Fauna Capture Records, Email - B Parfitt, EcoSM Spotter catcher letter reports Jan and Feb 2021, Fauna Capture Records). • Logs and hollows with habitat value have previously been salvaged during clearing campaigns. (Field). • 14 nest boxes have been installed in undisturbed habitat. (Field, AusEcology 2018). • Nest Box inspection was undertaken by a qualified ecologist during the previous reporting period (Email - Michael O'Connor to Belinda Parfitt). • Standard operating procedures require dust management in accordance with Dust management Plan (review finalised during reporting period) and Health and Safety Legislation. (Dust Management Plan). • Fences are maintained in good order and the lower strand is located at approximately 600 mm above the ground to enhance fauna movement. (Field). • Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment).

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
						<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <ul style="list-style-type: none"> Light is directed towards operations which is generally away from undisturbed areas. (Lighting plants field).
<p>Minimise risk of weed introduction and/or the spread of existing weed species in habitat area for MNES.</p>	<ul style="list-style-type: none"> No new weed species are established in areas of MNES habitat based on baseline data. Spreading of weeds does not occur relative to baseline data. 	<ul style="list-style-type: none"> Weeds will be managed in accordance with the Project's Weed and Pest Management Plan. The Plan will include the following: <ul style="list-style-type: none"> A site induction program that provides weed management information to staff, contractors and visitors. Detailed control measures aimed at eradicating where possible, or otherwise reducing the extent of weeds in accordance with the Queensland Department of Agriculture and Fisheries (DAF) guidelines and the requirements of the Biosecurity Act 2014. Weed washdown procedures for all vehicles brought to site that will be traveling beyond the site office carpark. Targeted weed control measures within the Project area. 	<ul style="list-style-type: none"> An increase in the average percent (%) cover score of weed species from baseline and/or previous monitoring events. Detection of weed species not previously recorded in the Project area during baseline and/or previous monitoring events. 	<ul style="list-style-type: none"> Monitoring of weeds outside of the disturbance areas will be undertaken during the habitat quality assessment surveys using similar methodology to the baseline ecological survey (Appendix A) and the habitat quality assessment methodology (Appendix B) and will be undertaken annually for the first three (3) years then every two years (refer to Section 5.0 (of SMP)). 	<ul style="list-style-type: none"> Should an increase in weed cover or presence of new weed species be observed, an investigation will be undertaken to determine the cause. This will involve reviewing adherence to the Weed and Pest Management Plan and an assessment of the distribution of weeds within the Project area in relation to baseline to determine the cause of the incursions. From the investigation, a Corrective Action Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the trigger being detected. The Contingency Plan will include appropriate corrective actions and an implementation schedule for those corrective actions. <p>Corrective Actions:</p> <ul style="list-style-type: none"> Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected. Potential corrective actions may include: <ul style="list-style-type: none"> Increasing the frequency and/or duration of weed control efforts. Investigating and/or implementing alternate weed 	<ul style="list-style-type: none"> Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment). The HSEC Training Package includes weed and pest management. (HSEC Training Package). Machinery entering site is required to be clean and free from dirt. A Washbay is located adjacent to the Administration area at the entrance to the mining area. (Heavy Vehicle Compliance Checklist incl weed Hygiene, Field (Washbay Inspection)). Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment). Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment).

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
					management control actions. <ul style="list-style-type: none"> o Amending weed hygiene practices. o Updating the Weed and Pest Management Plan. 	NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.
Reduce habitat degradation and potential predation on MNES by pest animals.	<ul style="list-style-type: none"> • No new pest animal species are established in areas of MNES habitat in comparison to baseline data. • Reduction in pest animal numbers in areas of habitat for MNES to below baseline levels. 	<ul style="list-style-type: none"> • Pest animals will be managed in accordance with the Project's Weed and Pest Management Plan. • The Project's Weed and Pest Management Plan includes requirements for: <ul style="list-style-type: none"> o Appropriate waste management and waste disposal. o A reporting framework to ensure sightings of pest animals are recorded. o Site inductions to include information on pest animals including control requirements, importance of appropriate waste management and reporting requirements when pest animals are observed within the Project area during construction and operation activities. o Control of pest animals. • Pest management actions outlined in the Weed and Pest Management Plan will primarily focus on those pest animals identified within the Project area and include Cane Toads, Feral Cats, Wild Dogs, House Mice and European Rabbits and that have a potential to impact on MNES and their habitat. Additional pests will be included as necessary if identified as occurring within the Project area during the habitat quality monitoring program (European Foxes and Feral Pigs). • Pest management will include a range of best management practice actions including shooting, trapping, fencing and baiting in and will be undertaken in accordance with site safety and health requirements, and DAF guidelines and the requirements of the Biosecurity Act 2014 and as permitted under the SHMS. 	<ul style="list-style-type: none"> • Observed increase in sightings/signs and/or the relative abundance of pest animals in areas of retained MNES habitat above baseline levels. • Direct observation or signs of, a pest animal not identified as occurring within the Project area during the baseline surveys. 	<ul style="list-style-type: none"> • Monitoring of pest animals in the retained MNES habitat will be undertaken using similar methodology (or an alternate methodology proposed by a suitably qualified ecologist) to the baseline ecological survey undertaken for the EPBC referral (Appendix A) as well as the habitat quality assessment methodology (Appendix B) and will be undertaken annually for the first three (3) years then every two (2) years thereafter (refer to Section 5.0(of SMP)). • Potential predation of MNES will also be assessed during the habitat quality scoring assessment and the riparian monitoring program (Appendix D) outlined above. 	<ul style="list-style-type: none"> • Should evidence of pest animals show an increase compared to baseline, undertake an investigation to assess possible reasons for the increase (e.g. inappropriate waste management leading to increased pest animals). • Should predation of MNES be observed undertake an investigation to assess possible reasons for the incident(s). • Review adherence to the Project's Weed and Pest Management Plan. • From the investigation, a Corrective Actions Contingency Plan will be developed by a suitably qualified ecologist within 20 business days of the trigger being detected. The Contingency Plan will include appropriate corrective actions and an implementation schedule for those corrective actions. <p>Corrective Actions:</p> <ul style="list-style-type: none"> • Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected. • Potential corrective actions may include: <ul style="list-style-type: none"> o Increasing the frequency and/or 	<ul style="list-style-type: none"> • Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment). • The Environment and Community - Training Induction Package includes weed and pest management. (Induction Training Package). • Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment). • Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment).

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
					<p>duration of pest animal control efforts.</p> <ul style="list-style-type: none"> ○ Investigating and/or implementing alternate pest animal control methods in consultation with DAF. ○ Updating the Weed and Pest Management Plan to include new species where relevant. 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p>
<p>Minimise impacts of dust deposition on habitat for MNES during construction and operation of the Project.</p>	<ul style="list-style-type: none"> • Dust deposition does not exceed 120 mg per square metre per day, averaged over one month when measured at any sensitive receptor as outlined in Condition B2 of the Project EA. • Dust is monitored in accordance with the Dust Management Plan which must be developed in accordance with Condition B5 of the Project's EA. 	<ul style="list-style-type: none"> • Dust suppression will be undertaken in accordance with the Dust Management Plan and include the following actions: <ul style="list-style-type: none"> ○ Staging vegetation clearing to minimise areas of disturbed and bare ground. ○ Progressively rehabilitating disturbed areas. ○ Removal and dumping of overburden as soon as reasonably practical following blasting activities ○ Regular watering of haul roads and access tracks in accordance with the CMSHR. ○ Dust suppression spraying of stockpiles. ○ Limiting grading and/or dozing in high dust generating areas. ○ Limiting overburden drilling. ○ Enforcing speed limits in accordance with the requirements of the CMSHA and CMSHR. 	<ul style="list-style-type: none"> • Dust deposition levels exceed 120 mg per square metre per day when averaged over one month at sensitive receptors. • Visual inspections of vegetation adjacent to the disturbance areas show visible signs of dust deposition. 	<ul style="list-style-type: none"> • Monitoring of dust deposition will be undertaken in accordance with Condition B2 and the Project's Dust Management Plan as required under Condition B5 of the Project's EA. • Existing monitoring includes visual inspections of vegetation adjacent to the disturbance areas. 	<ul style="list-style-type: none"> • In accordance with Conditions B3 and B4 of the Project's EA, if dust deposition monitoring exceed the trigger value of 120 mg per square metre averaged over one month, Stanmore must investigate whether the exceedance is a result of Project activities and notify the administering authority within seven days of the exceedance occurring. • Should an exceedance of dust deposition levels be attributed to Project activities Stanmore will implement dust abatement measures. <p>Corrective Actions:</p> <ul style="list-style-type: none"> • Corrective actions identified in the Dust Management plan will be implemented within 10 days of the trigger being detected. 	<ul style="list-style-type: none"> • Standard operating procedures require dust management in accordance with Dust management Plan and Health and Safety Legislation. (Dust Management Plan). • Vegetation Clearing is conducted progressively to minimise bare areas. (Field, Disturbance Permits, Disturbance Permit Register). • Rehabilitation is undertaken progressively in accordance with legislative requirements. (Field, Rehabilitation Tracker). • Blasting and overburden removal are consecutive components of the mining process. (Field). • Overburden drilling is undertaken only as required and free dig operations were observed during the site visit. (Field). • The maximum site speed limit is 60 km\hr and signage is located throughout the site. (Field). • Dust monitoring is undertaken. (Field, Stanmore website).
<p>Minimise noise and vibration impacts in areas of MNES habitat.</p>	<p>When measured, noise and vibration levels do not exceed criteria set out in Tables 15 and 16 of the Project EA at sensitive receptors.</p>	<ul style="list-style-type: none"> • Regularly maintaining and servicing all plant equipment to minimise machinery noise. • All engine covers will be kept closed while equipment is operating. • Blasting will only occur between 9am and 7pm. 	<ul style="list-style-type: none"> • When measured at sensitive receptors noise and vibration levels exceed criteria set out in Table 15, Table 16 and Table 17 of the Project's EA. • When blasting occurs outside of the approved blast times. 	<p>Noise and vibration monitoring will be undertaken in accordance with monitoring Conditions outlined in Section D of the Project's EA.</p>	<p>In accordance with Conditions under Section D of the Project's EA, if noise and vibration monitoring exceed the trigger values outlined, Stanmore must investigate whether the exceedances are the result of the mining activities and notify</p>	<ul style="list-style-type: none"> • Machinery is maintained and operated appropriately, no uncharacteristically noisy plant was noted during the site visit. (Field).

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
					<p>the administering authority within seven days of the exceedance occurring.</p> <ul style="list-style-type: none"> Should exceedance levels be attributed to mining activities, noise and vibration abatement measures will be implemented. <p>Corrective Actions:</p> <ul style="list-style-type: none"> Corrective actions identified during investigations will be implemented within 10 days of the trigger being detected. 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p>
<p>Minimise degradation of habitat for MNES from an increased risk of fire due resulting from Project activities.</p>	<p>No uncontrolled fires within the Project area resulting from Project related activities.</p>	<ul style="list-style-type: none"> Fire management for coal mining operations in Queensland is governed by the CMSHA and the CMSHR with the CMSHR prescribing management of fires for coal mines. Section 37 of the CMSHR prescribes that the coal mines Safety and Health Management System (SHMS) must include standard operating procedures for action to be taken when a fire is discovered at the mine. Buffers will be maintained around potential ignition sources such as plant and machinery, haul roads and mine infrastructure areas. Prior to site entry, all relevant site personnel, including contractors, will be made aware of fire safety and risks. Fuel loads will be minimised and managed through the weed control measures outlined in the Weed and Pest Management Plan. 	<ul style="list-style-type: none"> An uncontrolled fire occurs within the Project area that is due to mining activities. Weed cover exceeds baseline levels and groundcover biomass (e.g. vegetation) exceeds benchmark levels. 	<ul style="list-style-type: none"> Compliance with the SHMS will be monitored in accordance with the requirements of the CMSHA and CMSHR. Monitoring of biomass (groundcover including organic litter) for fire management will be undertaken during the habitat quality assessments that will occur annually for the first three (3) years then every two (2) years thereafter (refer to Section 5.0(of SMP)). 	<ul style="list-style-type: none"> Should an uncontrolled fire occur within the Project area, the Project's Emergency Response Plan will be enacted. Should any corrective actions and changes to fire management be required, they will be done in accordance with the CMSHA and CMSHR and incorporated into the SHMS. Should biomass monitoring indicate that there is a risk of an uncontrolled fire occurring, biomass control measures will be assessed by a suitably qualified ecologist within 20 business days and Corrective Actions suggested. Biomass control measures aimed at reducing fuel loads may include controlled burns, strategic grazing or modified weed management measures. <p>Corrective Actions: Any corrective actions identified will be implemented</p>	<ul style="list-style-type: none"> Fire management on site is in accordance with Health and Safety Legislation. Bush fire break plans are reviewed annually leading into summer (Sept/Oct) as part of 'Pre-Wet Season Preparation'. (Fire Break map, Weet season and sever weather preparation presentation). Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. This included baiting for dogs and pigs and spraying for Bellyache Bush. (BP, Baiting Environmental Brief and Map, Customer Record of Bellyache Bush treatment).

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
					within 30 days of the trigger being detected.	
Minimise alteration of Squatter Pigeon, Ornamental Snake and the riparian habitat from changes to water quality and hydraulic activity.	<ul style="list-style-type: none"> Water quality does not exceed trigger levels and at any of the monitoring sites listed in the Tables in Condition C – Water. Water quality monitoring is undertaken in accordance with the Receiving Environment Monitoring Program which must be developed in accordance with Condition C22 of the Project EA. Erosion and sediment control is undertaken in accordance with the Erosion and Sediment Control Plan (ESCP) as required by Condition C38 of the Project EA. 	<ul style="list-style-type: none"> Site stormwater management will be undertaken in accordance with the management plans and programs required by the Project's EA including a Receiving Environment Monitoring Program (REMP) required under Condition C22, Water Management Plan (WMP) required under Condition C31 and an ESCP required under Condition C38. The site specific WMP, REMP and ESCP as well as other water management requirements outlined in Section C of the Project's EA will be prepared by a suitably qualified person. Required management plans will be developed with the aim of minimising alterations to receiving environment water quality erosion, minimising mobilisation of sediments and minimising erosion related disturbances to the current hydrological regime. The maintenance and cleaning of any vehicles, plant or equipment must not be carried out in areas from which contaminants can be released into any receiving waters. Spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable to minimise the release of wastes, contaminants or materials to any stormwater drainage system or receiving waters. 	<ul style="list-style-type: none"> Water quality monitoring exceeds the approved receiving environment trigger levels outlined in the REMP and in Table 7 of the Projects EA and mine affected water quality levels exceed the trigger levels outlined in Table 3 of the Project's EA. Visual inspections of water management infrastructure show signs of failure. 	<ul style="list-style-type: none"> Water quality monitoring will be undertaken in accordance with the REMP as required by Conditions C22 and C23 of the Project's EA. Monitoring of the effectiveness of the erosion and sediment control devices and the water management will be undertaken in accordance with Conditions C32 of the Project's EA. 	<ul style="list-style-type: none"> In accordance with Condition C21 of the Project's EA, if water quality characteristics of the downstream monitoring point exceed trigger levels outlined in Table 7 of the EA, and these levels are higher than upstream monitoring locations, Stanmore must investigate the exceedance and the potential for environmental harm and provide a written report to the administering authority as part of the Project's Annual Return. Should an exceedance of water quality trigger levels be attributed to Project activities, an assessment on the effectiveness of the WMP and REMP will be undertaken and appropriate Corrective Actions included in Plan revisions and the Annual reports as required under Conditions C24 and C33 of the Project's EA. <p>Corrective Actions:</p> <ul style="list-style-type: none"> Corrective actions identified will be implemented within 10 days of the trigger being detected. 	<ul style="list-style-type: none"> Water management is undertaken in accordance with the Water Management Plan and subsequent reviews. (Water Management Plan and Review 2019, Field). The machinery wash-bay is a closed system and does not discharge offsite. (Field (Washbay Inspection Feb 2021)). Spill response and clean-up procedures and equipment are in place at site. (Field).
Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc.).	No mortality of, or injuries to, MNES as a result of Project activities (e.g. from clearing activities, vehicle strikes etc.).	<ul style="list-style-type: none"> Environmental awareness training will be provided to all workers as part of site induction and will include specific topics on MNES, risks and protective measures, and identification of the MNES. Pre-clearance surveys will be undertaken within 48 hours of clearing activities to assess the presence of MNES within the disturbance area to be cleared. At least one qualified Fauna Spotter/Catcher will be present during clearing activities. 	Injury or mortality to an MNES	<ul style="list-style-type: none"> All personnel will be required to be report any interactions between vehicles and/or /machinery and MNES in the Project area. Visual observations during normal working hours. 	<ul style="list-style-type: none"> Should an injury to, or mortality of, an MNES, an investigation will be undertaken to ascertain the cause of the injury or mortality. Should the injury or mortality be attributed to mining activities, a Contingency Plan will be 	<ul style="list-style-type: none"> The site Induction Package addresses the MNES and fauna reporting requirements. (HSEC Training Package). The maximum site speed limit is 60 km\hr and signage is located throughout the site. (Field). Spotter /catcher / Ecologist and (Clearing Contractor) attends site pre clearing (24- 48 hours) and remains on site during clearing, they are provided

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR July 2021 (Evidence)
		<ul style="list-style-type: none"> A wildlife carer will be called to collect any injured fauna. Speed limits of 60 km/hour will be set and enforced on all internal roads including haul roads Vehicles must abide by vehicle speed limits and access to any restricted areas or exclusion zones must be limited to critical site-specific activities to minimise threats to MNES. All injured fauna encountered during the construction and operation of the activity will be taken to a wildlife carer/facility or veterinarian within 24 hours. Where injured fauna is encountered, and it is unsafe to handle the animals, the following should be undertaken; <ul style="list-style-type: none"> The location of the injured animal will be identified so it can be located again The species of animal will be identified if possible and its sex and approximate size determined The type of injury sustained will be identified if possible The EO shall immediately contact Queensland's Department of Environment and Science (DES) and report the animal and arrange for its capture and transportation to a wildlife carer or veterinarian. 		<ul style="list-style-type: none"> Incidental observations during habitat quality assessments. 	<p>developed by a suitably qualified ecologist within 20 business days and will include Corrective Actions and an implementation schedule for the Corrective Actions.</p> <p>Corrective Actions:</p> <ul style="list-style-type: none"> Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected. 	<p>NOTE: NO ADDITIONAL HABITAT CLEARING WITHIN THE APPROVAL AREA OCCURRED DURING THE PERIOD OF THE COMPLIANCE REPORT – HOWEVER RECORDS FROM OTHER AREAS ARE EVIDENCED TO DEMONSTRATE COMMON PRACTICE.</p> <p>with the GIS clearing boundaries and direct the clearing machinery. Boundaries are pegged and bunted. The Site Senior Advisor HSEC is routinely moving around the mine site and observes the cleared areas as a matter of course. (EcoSM Spotter catcher letter reports Jan and Feb 2021).</p> <ul style="list-style-type: none"> Injured wildlife was directed to carers as required and record noted in Fauna Register (EcoSM Spotter catcher letter reports Jan and Feb 2021).

Offset Management Plan - Table 20: Proposed monitoring schedule of offset area

Habitat Quality surveys undertaken by suitably qualified ecologists						Audit Comments SLR July 2021
Initial habitat quality assessment	Site condition, site context and species stocking rates as outlined in this OAMP.	Initial and baseline assessment was completed in July and October 2020.	Visual inspections and detailed habitat quality assessment as per the Guide and as outlined in this OAMP.	Assessment sites outlined in Section 7.2 (of OAMP).		Completed as part of the OAMP.
Ecological Condition	Recruitment of woody perennial species in the ecologically dominant layer (EDL)	Year 1 (following approval of this OAMP and securing the offset area), then every 5 years until the end of the approval.	As per the methods outlined in the Guide and in Section 4.1 (of OAMP).			Due by 21 st of May 2022.
	Native plant species richness – trees		Visual observations and, where relevant, methods outlined in the Guide to determining terrestrial habitat quality and with reference to interim criteria as per Table 17 for the relevant RE and AU being monitored.			
	Native plant species richness – shrubs					
	Native plant species richness – grasses					
	Native plant species richness – forbs		Targeted MNES surveys aimed at assessing the presence of the species within the offset area will be undertaken in accordance with relevant survey guidelines and undertaken by suitably qualified ecologists.			
	Tree canopy height					
	Tree canopy cover					
	Shrub canopy cover					
	Native perennial grass cover					

	Organic litter				
	Large trees				
	Course woody debris				
	Non-native plant cover (i.e. weeds)				
	Quality and availability of food and foraging habitat (e.g. tree canopy height and cover, organic litter, tree and shrub species richness).				
	Quality and availability of shelter (e.g. presence of tree hollows).				
Site context	Threats to species (e.g. lack of EDL recruitment, presence of feral animals and weeds etc.).				As above
	Threats to mobility capacity.				
Species stocking rates /targeted fauna surveys for the MNES	Presence/absence of MNES. MNES abundance and density (where relevant).	Every five (5) years until the completion criteria have been achieved. The survey frequency is justified as changes to vegetation communities and ecosystems and the fauna that inhabit those communities takes time and is generally a relatively slow process.	Refer to 4.1 (of OAMP).	Refer to Section 7.2 (of OAMP).	Due May 2026.
Nest boxes	Presence of Greater Gliders and functionality of each box.	Twice yearly for the first 5 years then yearly until the end of the approval.	Refer to Section 7.4 (of OAMP).	At nest box locations.	Two inspections due by 21 st of May 2021.
Visual inspection surveys undertaken by the landowner or authorised landowner representative and targeted weed and feral animal surveys undertaken by suitably qualified ecologists.					
Photo points	General vegetation condition and vegetation cover.	Year 1 (following approval of this OAMP and securing the offset area), then every 5 years until the end of the approval.	Photographs of offset area to be taken from the same location and direction for each monitoring event.	Assessment sites outlined in Section 7.2 (of OAMP).	Due by 21 st of May 2022.
Grazing	Stocking rates, ground cover and fencing.	Stocking rates will be routinely monitored until the end of the approval. Biomass will be monitored annually in the early dry season. Fencing will be monitored during routine land management of the offset area and at least quarterly.	Assessments of the offset area will be undertaken by the landowner/land manager or authorised representative to observe and record grass cover, presence of weeds and pest animals, evidence of fire and evidence of unauthorised access. Fire break and fence maintenance activities will be recorded for inclusion in the annual report. Any unplanned fires will also be recorded as well as monitoring results for any planned cool or mosaic burns on habitat.	Assessment sites outlined in Section 7.0 (of OAMP).	To be undertaken routinely as part of land management activities throughout the year following approval of the OAMP (21 st of May 2021). Not relevant to the period of this Compliance Report.
Fire	Presence of fire and extent of burning.	At least quarterly and following known fire events. Biomass will be monitored annually in the early dry season.			
Feral animals	Presence of pest animals, control measures undertaken and success of the control measures.	Visual inspections undertaken during routine land management. Year 1 (following approval of this OAMP and securing the offset area), then every 5 years until the end of the approval.	Weed cover will be recorded as per the Level 2B methodology described in the Land Manager's Monitoring Guide (DERM, 2010) (or any subsequent published version of this document or similar recognised methods). This methodology is suitable for		

Weeds/ pest plants	Presence of weeds, control measures undertaken and success of the control measures.	Visual inspections undertaken during routine land management. Year 1 (following approval of this OAMP and securing the offset area), then every 5 years until the end of the approval.	landowners to rapidly assess whether weed management measures need to be conducted within the offset area. Detailed assessments as outlined in Section 7.0 will also be undertaken in conjunction with the habitat quality assessments.		
Fencing and site access	Condition of fencing and access tracks.	Visual inspections undertaken during routine land management.			
Unauthorised impacts to vegetation from activities such as illegal harvesting and illegal access.	Unauthorised clearing or disturbances.	Visual inspections undertaken during routine land management and undertaken at least quarterly.	Observe and record accessibility to the offset site (i.e. condition of fencing), evidence and location of illegal clearing, fire and/or pest animal incursion.	Throughout the offset area and particularly along and adjacent to the road licence easement and the boundary to the Epsom State Forest.	To be undertaken routinely as part of land management activities throughout the year following approval of the OAMP (21 st of May 2021). Not relevant to the period of this Compliance Report.
Cyclone events	Condition and damage to vegetation and any dead or injured fauna.	Following cyclones or large tropical rainfall events.	Visual throughout the offset area.	Throughout the offset area.	Not relevant to the period of this Compliance Report.

APPENDIX B

Site Visit and Evidence Photos



Approved clearing limit markers (a)



Approved clearing limit marker (b)



Approved clearing limit marker (c)



Fence Condition and lower strand clearance (a)



Fence Condition and lower strand clearance (b)



Free Dig Overburden Operations (from February 2021 Audit)



MNES Species Bench Seats (a)



MNES Species Bench Seat (b)



MNES Species Awareness Sign



Drainage and Sediment Control



Aerial Photo for Planning Purposes
(Environmental Office)



Post Clearing Inspection to Ensure Compliance
(Supplied Stanmore)



Nestbox (a)



Nestbox (b)



Water Monitoring Station Smokey Creek (a)



Water Monitoring Station Issac River (b)

APPENDIX C

Isaac Plains Complex 2020 Annual Groundwater Review – May 2021

Appendix C contents here

APPENDIX D

Isaac Plains Complex Groundwater Sampling Results January/ February 2021 and April 2021

Appendix D contents here

ASIA PACIFIC OFFICES

BRISBANE

Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

MACKAY

21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

PERTH

Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

AUCKLAND

Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

CANBERRA

GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

MELBOURNE

Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

SYDNEY

Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

NELSON

6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

DARWIN

Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

NEWCASTLE

10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

TOWNSVILLE

12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

GOLD COAST

Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

NEWCASTLE CBD

Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

WOLLONGONG

Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000

APPENDIX B

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Aerial Photo for Planning Purposes
(Environmental Office)



Post Clearing Inspection to Ensure Compliance
(Supplied Stanmore)



Nestbox (a)



Nestbox (b)



Water Monitoring Station Smokey Creek (a)



Water Monitoring Station Issac River (b)

APPENDIX C

Isaac Plains Complex 2020 Annual Groundwater Review – May 2021



C&R CONSULTING

Geochemical & Hydrobiological Solutions Pty Ltd

ABN 72 077 518 784

Underground Coal Gasification / Coal Seam Gas Investigations
Mineralogical, Geological, Petrographic and Soils Services
Hydrogeomorphic and Palaeogeomorphic Evaluations
Terrestrial and Aquatic Fauna and Flora Surveys
Climate History and Extreme Events Analysis
Contaminated Site and Mine Water Analysis
Environmental Compliance and Monitoring
Estuarine and Marine Water Assessments
Registered Research and Development
Surface and Groundwater Hydrology

PO Box 1777
Thuringowa, Qld 4817, Australia

Tel: +61 (0) 7 4725 3751

info@candrconsulting.com.au
www.candrconsulting.com.au

ISAAC PLAINS COMPLEX



2020 Annual Groundwater Review

REPORT PREPARED FOR:



Date: May 2021



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A handwritten signature in black ink that reads "Christopher Cuff".

Dr Chris Cuff
Director

21/05/2021

Date

A handwritten signature in black ink that reads "Cecily Rasmussen".

Dr Cecily Rasmussen
Director

21/05/2021

Date



IMPORTANT INFORMATION

1. This report is prepared and written in the context of the proposals stated in the introduction to this report and its contents should not be used out of context. Furthermore new information, developing practices and changes in legislation may necessitate revised interpretation of the report after its original submission.
2. The copyright in the written materials shall remain the property of C&R Consulting but with a royalty-free perpetual licence to the client deemed to be granted on payment in full to C&R Consulting by the client of the outstanding amounts.
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5. This report contains only available factual data obtained for the site/s from the sources described in the text. These data were related to the site/s on the basis of the location information made available to C&R Consulting by the client.
6. The assessment of the site/s is based on information supplied by the client, and on-site inspections by C&R Consulting.
7. The report reflects both the information provided to C&R Consulting in documents made available for review and the results of observations and consultations by C&R Consulting staff.



SUMMARY OF RELEVANT INFORMATION

Project Title	2020 Annual Groundwater Review
Property Location	Isaac Plains Complex
Property Description	Open-cut coal mine
Project Purpose	Review the groundwater management and monitoring plan and the data collected in accordance with environmental authority Condition C41
Project Number	20122
Client's Details	
Nominated Representative	Belinda Parfitt
Title/Position	Senior Advisor (HSEC)
Company	Stanmore IP Coal
Telephone	0437 931 172
Email	Belinda.Parfitt@stanmorecoal.com.au
Author's Details	
Primary Author	S. Kennare
Qualifications	Graduate Diploma of Science (Groundwater Hydrology), Master of Environmental Management
Experience	8+ years
Affiliations	International Association of Hydrogeologists

DOCUMENT CONTROL

Version	Compiled by	Date issued	Reviewer(s)	Date returned
Draft 1	S. Kennare A. Barnes	14/04/2021	Dr J. Jaffrés	19/04/2021
Draft 2	A. Barnes	21/04/2021	B. Parfitt	14/05/2021
FINAL	S. Kennare	21/05/2021	-	-



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1. INTRODUCTION

1.1 OBJECTIVES

This document provides a review of the groundwater monitoring results from the Isaac Plains Complex (IPC) from May 2019 to December 2020 (inclusive), as per the current environmental authority (EA) (EPML00932713), effective from 27 July 2020.

The EA states that:

Condition C40: Monitoring and reporting

A Groundwater Management and Monitoring Program for all stages of the authorised mining activities on site must be developed, certified and implemented by a suitably qualified person;

- a) have all determinations of groundwater quality monitoring and groundwater biological monitoring be performed by a suitably qualified person; and*
- b) be able to detect a change in groundwater quality values and levels due to activities that are part of the authorised mining activities.*

Condition C41:

The Groundwater Management and Monitoring Program required by Condition C40 and the data collected must be reviewed on an annual basis by a suitably qualified person. The review must:

- a) include the assessment of groundwater levels and quality data;*
- b) assess the suitability of the groundwater monitoring network, including an assessment of whether groundwater parameter trigger values for compliance bores are required for all groundwater aquifers potentially impacted by the authorised mining activities; and*
- c) be in a report submitted to the administering authority within twenty-eight (28) days of receiving annual groundwater data.*

Condition C42:

Groundwater must be monitored at the locations and frequencies defined in Table 11: Groundwater monitoring locations frequency for the standing water levels and the parameters identified in Table 12: Groundwater contaminant triggers. Results and analysis of groundwater monitoring must be submitted annually to the administering authority with the report required by Condition C41(c).



Table 1: EA Table 11 – Groundwater monitoring locations and frequency.

Monitoring Point	Location		Surface RL	Hydro stratigraphic Unit	Screening interval (mbgl)	Monitoring frequency
	Easting (GDA94 – Zone 55)	Northing (GDA94 – Zone 55)				
Burton Coal Bore 2	620383	7573599	240.8	Rewan Group	30.3 – 34.6	Quarterly
Swamp Bore 1 (referred to as Swamp Bore 2 in the EA)	621518	7568790	245.9	Rewan Group	24.0 – 55.1	Quarterly
MB1	618793	7572214	236.4	Rangal Coal Measures	22.5 – 28.4	Quarterly
MB2	619074	7573137	242.7	Rangal Coal Measures	48.7 – 51.6	Quarterly
MB3	619047	7568473	253.0	Rangal Coal Measures	49.7 – 52.6	Quarterly
MB4a	620351	7567479	237.6	Quaternary Colluvium / Tertiary Sediments	7.8 – 10.7	Quarterly
MB4b	619740	7567253	233.9	Rangal Coal Measures	9.4 – 12.4	Quarterly
MB8	619105	7571149	245.9	Rangal Coal Measures	117.3 – 120.3	Quarterly
MB9	620368	7568049	239.5	Rangal Coal Measures	77.5 – 80.5	Quarterly
MB10	620368	7568046	239.5	Tertiary Basalt	21.0 – 27.0	Quarterly
MB11	618832	7571924	232.3	Tertiary Sediments	3.0 – 4.0	Quarterly
MB12	619210	7572000	239.5	Rangal Coal Measures	126.0 – 128.0	Quarterly
MB13	619367	7571035	249.7	Rangal Coal Measures	95.0 – 97.0	Quarterly
MB14	620263	7571132	257.3	Tertiary Basalt	20.0 – 23.0	Quarterly
MB15	620633	7568080	242.9	Rangal Coal Measures	115.0 – 119.0	Quarterly
MB16	620670	7568599	245.6	Tertiary Sediments	8.0 – 11.0	Quarterly



Table 2: EA Table 12 – Groundwater contaminant triggers.

Parameter	Unit	Trigger Values – Swamp Bore 1 (referred to as Swamp Bore 2 in the EA)	Trigger Values – Burton Coal Bore 2	Limit Type
Aluminum	µg/L	10	10	Maximum
Antimony	µg/L	1	1	Maximum
Arsenic	µg/L	2	4	Maximum
Calcium	mg/L	580	195	Maximum
Chloride	mg/L	3500	2050	Maximum
Carbonate	mg/L	1	7	Maximum
Total Dissolved Solids	mg/L	7585	4500	Maximum
Electrical Conductivity	µS/cm	9500	7320	Maximum
Bicarbonate	mg/L	94	820	Maximum
Iron	µg/L	1000	230	Maximum
Magnesium	mg/L	165	265	Maximum
Mercury	µg/L	0.1	0.1	Maximum
Molybdenum	µg/L	1	1.0	Maximum
Total Petroleum Hydrocarbons C6-C9	µg/L	20	20	Maximum
Total Petroleum Hydrocarbons C10-C36	µg/L	50	50	Maximum
pH	pH units	7.1 – 7.8	7.0 – 8.3	Minimum / Maximum
Potassium	mg/L	25	8	Maximum
Selenium	µg/L	10	10	Maximum
Silver	µg/L	1	1	Maximum
Sulfate	mg/L	150	130	Maximum
Sodium	mg/L	1275	990	Maximum
Suspended Solids (Total)	mg/L	37	52	Maximum

1.2 MINE LOCATION AND DESIGN

IPC is located within the Isaac Regional Council on both freehold land and state leasehold land in Central Queensland, approximately 10 km to the north-east of Moranbah and 140 km south-west of Mackay (

Figure 1). The project is situated immediately north of the Peak Downs Highway, between Moranbah and Coppabella, and has a rail loop off the south of the Goonyella Branch Rail Line (

Figure 1).

IPC was placed in care and maintenance by Vale S. A. and Sumitomo Corporation in December 2014. In July 2015, ownership of the mine was transferred from Vale S. A. and Sumitomo Corporation to Stanmore IP Coal Pty Ltd (Stanmore), with mining operations recommencing in January 2016.

The original IPC mining lease (ML70342) comprises pits N1, N2, S1, S2 and S3. These pits are north of the Isaac River and upstream of the Isaac River-Smoky Creek confluence, with Smoky Creek bisecting the ML70342 lease area. Most mining at IPC is open-cut and based on a strip-mining technique, with waste removed by a combination of cast blasting, dozing, dragline spoiling and/or truck and excavator removal.

In 2018, Stanmore was granted the approval to commence additional open-cut operations in mining leases located to the east of the original ML70342 mining lease. This expansion of IPC operations into leases ML700016, ML700017, ML700018 and ML700019 commenced in the second half of 2018, and is referred to as Isaac Plains East (IPE).

Isaac Plains East Extension (IPEE) was granted EPBC approval on 4th Dec 2020, which includes further land on leases ML700016, ML700017, ML700018 and ML700019. Operations commenced in these new areas in December 2020.

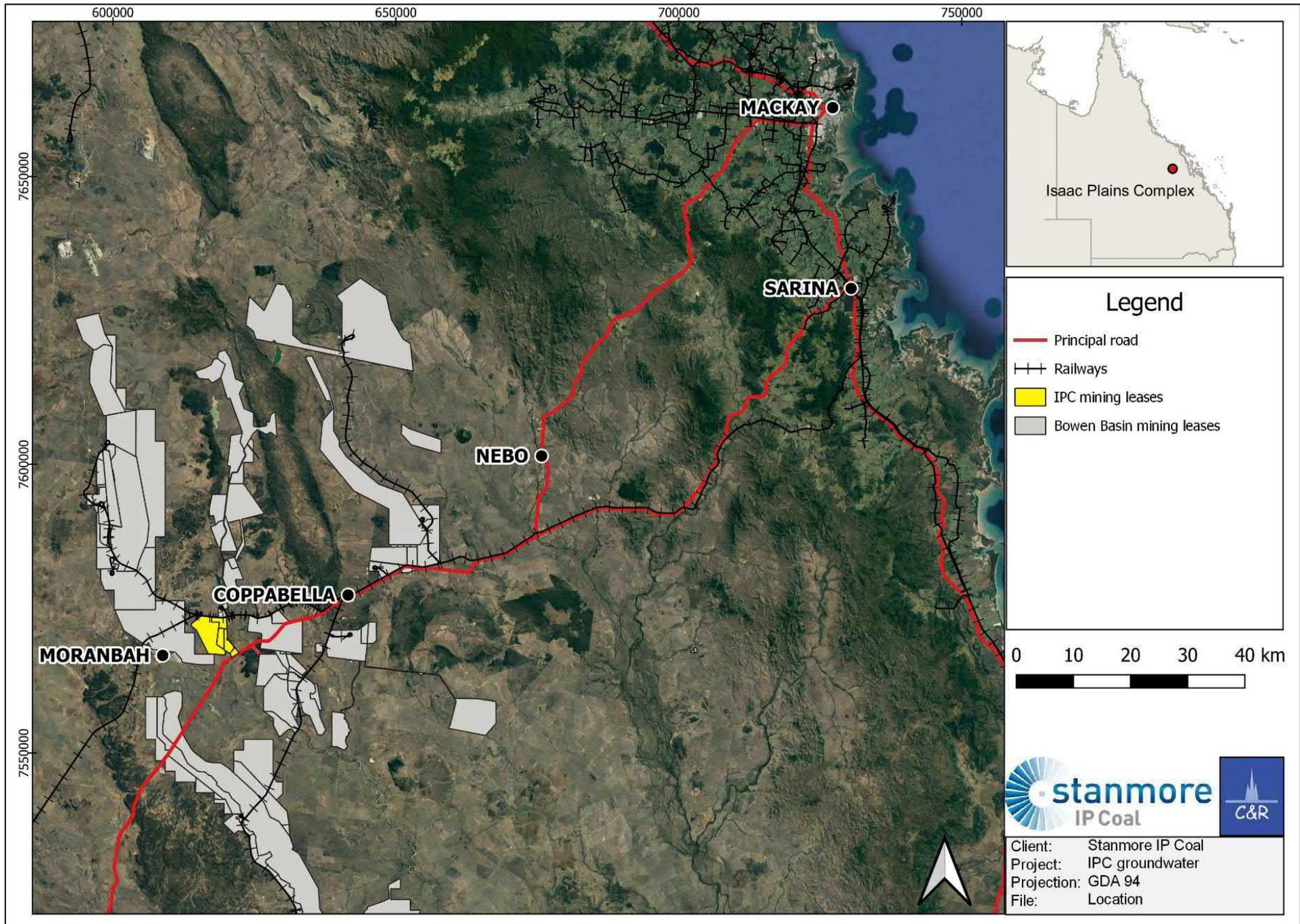


Figure 1: IPC location and mining leases.

2. SITE CONDITIONS

2.1 CLIMATE

The climate in Central Queensland is seasonally arid. Rainfall in the area is notoriously unreliable in its intensity and duration, both temporally and spatially. Intense rainfall events throughout the summer months (wet season) dominate the climate cycle (Figure 2). Most of these rainfall events occur in distinct, spatially separated cells across the landscape. Intense rainfall events are typically associated with tropical cyclone activity on the coast, and the remnant low pressure systems that move inland.

Far less rainfall is experienced throughout the dry season, with less than 35% of total rain typically falling in the winter months (May to October). Evaporation tends to exceed rainfall for almost all days of the year except during intense rainfall events, as indicated by the monthly averages (Figure 2). The extended dry season causes baking and crusting of surface soils. These processes lead to greatly reduced infiltration through surface soils unless suitable pre-wetting is provided by gentle rain prior to the wet season. If pre-wetting rains have not occurred, more than 90% of rainfall can eventuate as runoff throughout catchments, altering stage-discharge relationships within waterways.

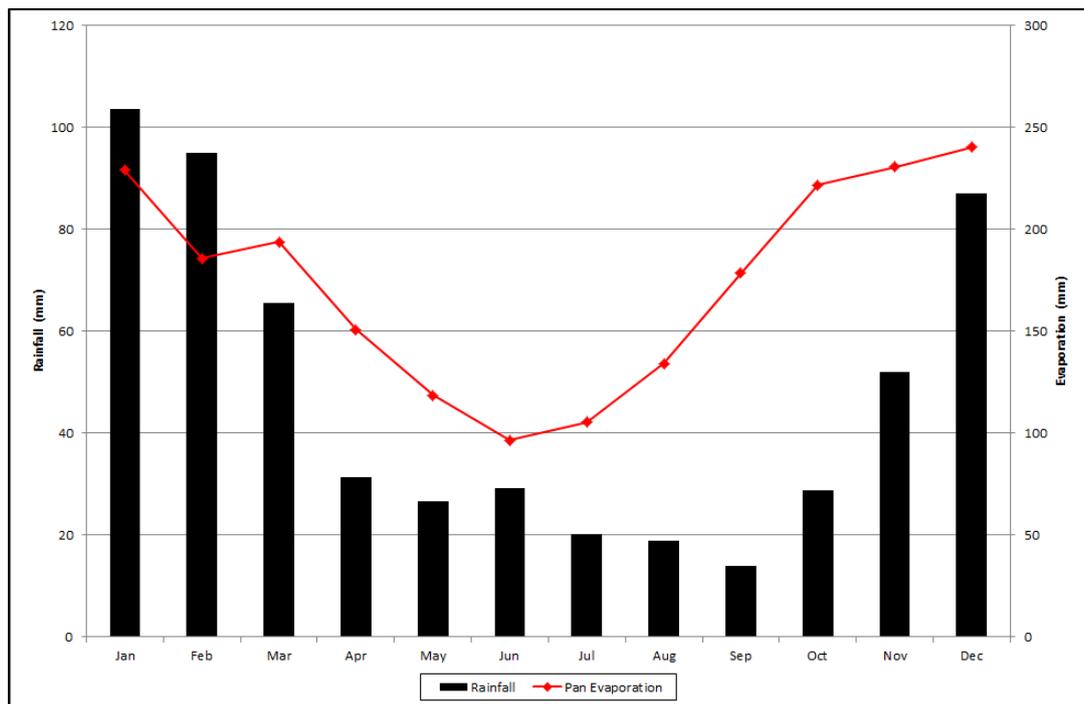


Figure 2: Average monthly rainfall and evaporation values for the region.

2.2 SOILS

Several soil types are located within the IPC mining leases. These are described in the *Integrated Isaac Plains Project Amalgamated Environmental Impact Statement* (Matrix+, 2009) and include:

- A1 Alluvial sandy duplex soil.
- A2 Red duplex with thin, sandy clay loam overlying hard, coarse-structured, brown clay.

- B1 Uniform grey/brown clays with areas of gilgai on flat to gently undulating plains.
- B2 Sandy uniform clay or thin red/brown duplex soils overlying weathered shale/mudstone on undulating plains. Sandy surface is often gravelly.
- B3 Crusting and often gravelly sand clays associated with mesa scree slopes.
- B4 Melon-holed clay lowlands.
- B5 Hard-setting, gravelly, brown clay.
- E1 Sandy duplex on undulating plains.
- R1 Residual low hill of lateritised basalt.

These soil types can be grouped into the following three broad categories under the Australian Soil Classification system (Ashton and McKenzie, 2001): brown Sodosols, red Chromosols and Vertisols.

2.2.1 SODOSOLS (A1 B5 E1)

This soil type occupies older alluvial plains associated with the Isaac River. It occurs on flat plains and is susceptible to occasional flooding. Soils are uniform, silty clays and mostly clear of vegetation. Nutrient levels are strong within the surface 30-40 cm layer. However, levels decrease below this depth. The surface structure is fine, sandy clay over a silty clay profile with substantial rooting depth. The soil is not reactive, although the stratified, alluvial nature of the medium is such that it should not be used for water holding structures. Material below 30 cm with the B2 horizon may be slightly sodic and should therefore be avoided.

2.2.2 CHROMOSOLS (A2 B2 B3)

This soil occupies mid- to upper-slope positions within undulating lands. The surface structure is firm and sandy, with ironstone gravel common. These soils have fairly hard-structured, light clay subsoils over weathered material, but appear to be well drained to at least 40 cm in most instances. Problems are associated with subsoil sodicity and salinity below 30 cm depth, with its coarse structure not assisting.

2.2.3 VERTISOLS (B1 & B4)

The soils are brown to grey, moderately well structured, generally non-cracking clays that support abundant buffel pasture. Saline and sodic conditions prevail immediately below 20 cm depth. Some of the area may include shallow (up to 15 cm deep) gilgai of brown, sandy clay interspersed with grey clay depressions. The surface structure is sandy and firm, with areas of ironstone gravel. In most instances, drainage is not impeded to 40 cm.

2.3 GEOLOGY

Most of the land surface is made up of deeply weathered profiles of Permian-Triassic rock, with *in situ* weathering, soil development and minor alluvium that, for the most part, conceal these rocks across the lease.

Tertiary-aged, poorly consolidated sandstone forms part of an earlier, thin sequence that covered much of the district. This sequence and older lithologies were eroded down to a flat surface (peneplain) that is capped with duricrust (ferricrete) or carbonate laterites. Locally, the sequence has been eroded back to a table top to the north, leaving behind mesas of sandstone on and around the lease.

Prior to and during this erosion period in the Tertiary, volcanic activity produced widespread basaltic lava flows. At least two basalt flows have taken advantage of an earlier deep river,



passing down the eastern length of the lease. Remnants of the lava flows persist in mesas east of the lease and part of the northern table top, while the remainder has been weathered down to the current alluvial flat developing across the site.

Thin coal beds exist as layers in packages of sedimentary beds called 'coal measures' which reflect the fact that coal seams split, thicken and thin, and are interfingered with other sediments at their time of formation. These sediments can include relatively porous sandstones conducive to groundwater flow. The coal beds themselves are frequently significant conduits to groundwater and provide local aquifer systems.

The economic coal measures at Isaac Plains are the Rangal Coal Measures and Fort Cooper Coal Measures. Both are part of the late Permian Blackwater Group. This group of rocks extends throughout the western half of the Bowen Basin.

2.4 HYDROGEOLOGY

There are five principal hydrostratigraphic units within the IPC tenement areas:

1. Quaternary alluvium/colluvium;
2. Tertiary sediments;
3. Tertiary basalt;
4. Triassic Rewan Group; and
5. Late Permian Rangal Coal Measures and Fort Cooper Coal Measures.

The Quaternary alluvium/colluvium and Tertiary sediments are associated with channel deposits of Smoky Creek and the Isaac River (Table 3 and Figure 3). In 2018, Klohn Crippen Berger (KCB) completed field investigations to assess the extent of the alluvium in relation to Smoky Creek. This followed instruction from the Department of Environment and Science (DES) that a monitoring bore must be installed to monitor the alluvium. However, when drilling adjacent to Smoky Creek for the monitoring bore, no alluvium was found to be present. The selection of this monitoring bore location was based on the mapped alluvium presented in the Mount Coolon 1:250,000 map sheet (where the alluvium is mapped as having an extent of up to about 500 m adjacent to Smoky Creek). As per the findings of the field investigation, KCB (2018) reported:

The extent of the sediments was identified to be limited to the water course channel as the channel is deeply incised, with the creek banks comprising weathered bedrock. Furthermore, outcrops of weathered bedrock occur within the channel of Smoky Creek, identifying the limited depth of unconsolidated sediments.

Tertiary basalt flows outcrop to the north-east of tenement ML70342, and some of these basalt flows constitute aquifers in several surrounding areas. Confinement of the late Permian strata is variable locally, depending on pressure distribution and depth. Stratigraphic descriptions for each unit are provided in Table 3. Surface distribution of each unit is complicated by numerous regional structures, including at least one syncline and several thrust faults truncating the eastward-dipping target beds. The aquifers of the Isaac Plains area are described in the following sections (Sections 2.4.1 to 2.4.3), with reference made to aquifer characteristics, groundwater flow and groundwater quality for each unit.

Table 3: Stratigraphic units of the Isaac Plains region.

Map Symbols#	Age	Group	Name/Formation	Short Description
Cza	Quaternary		Alluvium / Colluvium	Alluvium: mud, sand, minor gravel. Colluvium and residual soil: mud, sand, gravel ^{##} .
Czb	Cenozoic		Tertiary basalt	Basalt flows.
Czs*			Suttor Formation*	Sandstone, mudstone, claystone.
Ki*	Cretaceous		Unnamed*	Intrusives: granodiorite, diorite, gabbro.
TRr	Triassic	Rewan Group	Rewan Formation	Green lithic sandstone, green and red sandstone and mudstone.
Pwj	Late Permian	Blackwater Group	Rangal Coal Measures	Lithic sandstone, coal, siltstone, carbonaceous shale, mudstone (locally cherty), rare pebbly sandstone.
Pwt			Fort Cooper Coal Measures	Medium to coarse-grained volcanolithic sandstone, conglomerate, tuff, tuffaceous mudstone, coal, shale.
Pwb*			Moranbah Coal Measures*	Lithic sandstone, siltstone, shale, coal, mudstone, conglomerate.
Pb*		Back Creek Group*	Marine sandstone, siltstone, shale.	

*Formation/unit is present outside the lease area and is not discussed at length in the text.

#Map symbols as per 1:100,000 geological maps Harrybrandt (8554) and Grosvenor Downs (8553) (Geological Survey of Queensland [GSQ], 2014; see Figure 3).

##Several generations of alluvium and colluvium exist, but only the older, more substantive one is mapped in Figure 3.

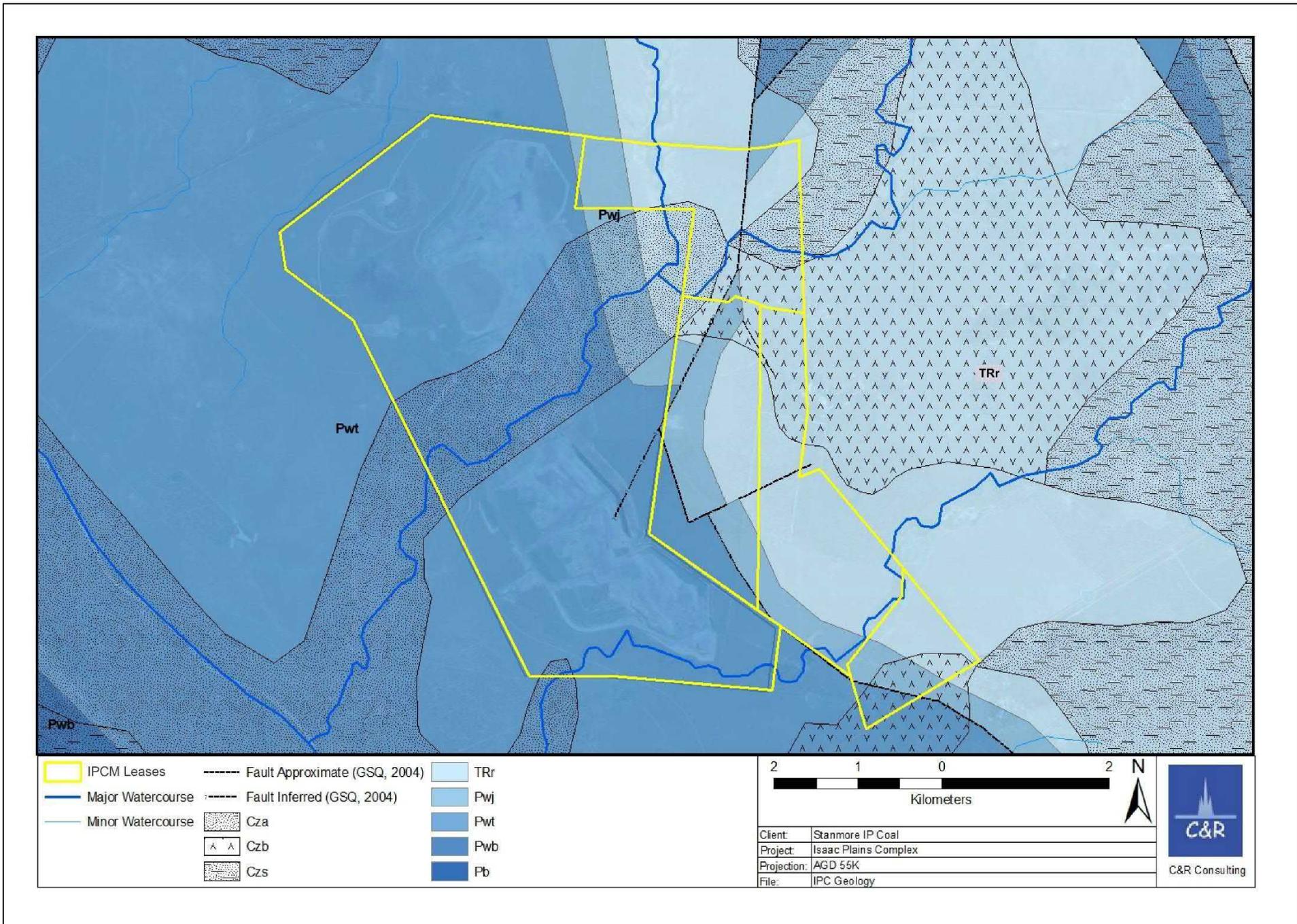


Figure 3: Major geological units for IPC.

2.4.1 QUATERNARY DEPOSITS

2.4.1.1 *Lithology*

Several generations of Quaternary palaeochannel sediment deposition resulted in a complex distribution of alluvial aquifers across the region. There are at least three Quaternary units present (Geological Survey of Queensland [GSQ], 2004):

1. Younger Quaternary alluvium;
2. Quaternary colluvium; and
3. Older Quaternary alluvium.

Of these, only the older Quaternary alluvium/colluvium, comprising a relatively thick deposit along the Isaac River and Smoky Creek, is shown in Figure 3 (map symbol Cza; see also Table 3). KCB (2018) found the extent of the Quaternary alluvium/colluvium was identified to be limited to the Smoky Creek watercourse channel, as the channel is deeply incised, with the creek banks comprising weathered bedrock. Furthermore, outcrops of weathered bedrock occur within the channel of Smoky Creek, identifying the limited depth of unconsolidated sediments.

The alluvial/colluvial deposits have very heterogeneous lithology, reflecting the depositional environment. In the area surrounding IPC, the alluvial/colluvial deposits of the Isaac River mainly consist of upward-fining packages of gravel, sand, silt and clay (Matrix+, 2009). The grain size and textural variation of these sediments mean that hydraulic properties are extremely variable, but sandy units are generally of high hydraulic conductivity. The potential resource within these deposits is unknown and groundwater use from them is expected to be only for environmental purposes. The impacts from mining activities on these aquifers is expected to be limited to water quality impacts from discharge of excess waters from on-site dams.

2.4.1.2 *Quaternary Alluvium/Colluvium Aquifer Properties*

Typical thicknesses of the alluvial/colluvial aquifers in the IPC mining area range from 5 m to 19 m. However, monitoring bores indicate that the saturated thickness of the alluvial/colluvial aquifer is generally about 3 m (corresponding to an average water-table elevation of approximately 188 m AHD). Most exploration holes drilled into alluvial/colluvial sediments associated with the Isaac River, did not encounter significant groundwater supplies. Results from hydraulic testing of the alluvial/colluvial aquifer show a local hydraulic conductivity of 2.3 to 3.6 m/day.

2.4.1.3 *Groundwater Flow in Quaternary Alluvium/Colluvium Aquifers*

The alluvial/colluvial groundwater is typically recharged by flows in contemporary waterways during peak flows or floods (SKM, 2009), and/or from direct infiltration through overlying soil profiles during rainy months. Consequently, the rate of groundwater flow and height of the water table in these alluvial/colluvial aquifers are variable and annual recharge is not consistent.

Alluvial/colluvial groundwater quality found at a regional scale (e.g. the Isaac River catchment) suggests some mixing with groundwater from the underlying Late Permian strata (rather than regular recharge via direct rainfall or river flow), with electrical conductivity (EC) often greater than 10,000 $\mu\text{S}/\text{cm}$. The regional flow of groundwater within the Quaternary sediments is expected to be southwards and south-eastward, congruent with surface drainage. Groundwater discharge occurs mainly via evapotranspiration. However, it may also occur locally through baseflow to streams during dry periods. During peak river flow in the wet months, “gaining stream” conditions are precluded, meaning that baseflow does not occur (SKM, 2009).

2.4.1.4 *Groundwater Quality in the Quaternary Alluvium/Colluvium*

Groundwater of the alluvium/colluvium has variable quality, reflecting the highly localised flow paths that dominate this system. At a regional scale, (e.g. the Isaac River catchment), the alluvial/colluvial groundwater EC ranges from below 500 $\mu\text{S/cm}$ to over 10,000 $\mu\text{S/cm}$ (SKM, 2009).

At IPC, the groundwater quality of the alluvium/colluvium is not well constrained. This is due to the fact that the alluvium is quite discrete (refer to Section 2.4) and no groundwater-bearing alluvium has been found to date at IPC. Groundwater is measured in colluvial sediments at IPC, although sampling occurs at the contact with Tertiary sediments and is reflective of a mixture of Quaternary/Tertiary groundwater.

2.4.2 TERTIARY BASALT

2.4.2.1 *Lithology*

Cenozoic volcanic rocks (Czb), also referred to as Tertiary basalt, outcrop to the east of the Isaac Plains Mine, near the Wotonga homestead (Matrix+, 2009). These volcanics probably represent the most southerly extent of basalt flows from the Nebo Province (Stephenson *et al.*, 1980) and are predominantly mafic (basaltic) but also include trachyte, rhyolite, tuff and high level intrusives mapped outside of the lease area (PW Baker & Associates, 2011). The volcanics mostly overlie the late Permian succession of the Bowen Basin and have an inverted topography associated with tributary drainage that is locally occupying an ancestral watercourse of the Isaac River. At least nine basalt flows are observed in GSQ drilling. These are encountered in the Drake and Grosvenor boreholes. The Tertiary basalt regionally underlies Quaternary sediments of the Suttor and Isaac River catchments, except where partially exhumed by weathering (Stephenson *et al.*, 1980).

2.4.2.2 *Basalt Aquifer Properties*

The Tertiary basalt flows across the region constitute shallow fractured rock aquifers that are known to be used for local supplies of stock and domestic water (SKM, 2009). Typically, basalt aquifers are characterised by a network of cooling fractures that are often not well connected (exhibiting anisotropy of hydraulic conductivity), so the resultant groundwater yield is unpredictable. There is a productive Tertiary basalt aquifer to the north-east of IPC, adjacent to the Broadlea Mine, which hosts a large volume of groundwater (refer to section 2.4.2.4). Apart from this distant basalt aquifer (adjacent to Broadlea Mine), the hydraulic characteristics of the basalt flows proximal to the Isaac Plains Mine area are not yet quantified.

2.4.2.3 *Groundwater Flow in Basalt*

As the lateral extents of the basalt flows of the region are not completely known, and they are not spatially contiguous over large areas, groundwater flow in this Tertiary basalt unit is likely localised rather than regional. Further, much of the thickness of basalt flows are close to the surface and may be unsaturated, or only saturated when the watertable rises in response to recharge periods. Ephemeral and local flow, mainly via sub-vertical recharge and discharge, is expected to be the dominant flow mechanism in the Tertiary basalt.

2.4.2.4 *Groundwater Quality in Basalt*

Fractures within a basalt flow proximal to the Broadlea Mine are anticipated to contain about 11,000 ML of relatively good quality water, with EC ranging between 760 $\mu\text{S/cm}$ and 5,300 $\mu\text{S/cm}$. However, the lateral extent of the reservoir is not known. Apart from the Broadlea basalt flow, the utility of the basalt aquifer in other areas is usually associated with relatively low yields and poor water quality.

2.4.3 LATE PERMIAN COAL MEASURES

2.4.3.1 *Lithology*

The two main late Permian units in the region are the older Fort Cooper Coal Measures and the younger Rangal Coal Measures (Figure 3 and Table 3). The late Permian stratigraphy described in this section is relevant to the entire area, but pertains directly to rocks intercepted by drilling and mining at IPC.

Coal mining at IPC targets the Leichhardt seam of the Rangal Coal Measures, which comprises interbedded units of lithic sandstone, coal, siltstone, carbonaceous shale, mudstone and pebbly sandstone. Within the IPC lease, the Leichhardt seam is found between 60 m and 230 m below ground level, and is approximately 3.5 m thick as a whole (as it splits to an upper and lower seam in the northern part of the lease). Strata dip of the Rangal Coal Measures in the IPC lease is approximately 6° to 7° to the east.

2.4.3.1.1 *Sandstone and Siltstone Above Target Coal*

The regional late Permian sedimentary rock succession is extensive and underlies the Quaternary alluvium/colluvium and Tertiary basalt cover (PW Baker & Associates, 2011). The late Permian succession comprises sandstone, siltstone, mudstone, shale and coal (PW Baker & Associates, 2011). Both the Rangal Coal Measures and the Fort Cooper Coal Measures are dominated by lithic sandstones. However, the Fort Copper Coal Measures can be distinguished from the Rangal Coal Measures due to the presence of significant volcanolithic content (tuff and tuffaceous mudstone).

2.4.3.1.2 *Target Coal Seam*

The Leichardt coal seam, the target of IPC mining, may arguably be considered an aquifer, given the characteristics referred to in section 2.4.3.4. The coal seam is generally 3.5 m thick and dips to the east across the site.

2.4.3.1.3 *Lithic Sandstone Below Target Coal*

The typical units that underlie the Leichardt seam are late Permian fine to medium, quartz-lithic sandstone interbedded with siltstone and carbonaceous mudstone. The sandstone beds are typically carbonate-cemented, with moderate to high porosity.

2.4.3.2 *Late Permian Aquifer Properties*

The late Permian coal measures provide modest groundwater supplies for livestock and agricultural uses in the region (Matrix+, 2009), where extraction rates are generally limited to approximately 0.5 L/s (PW Baker & Associates, 2011). Borehole logs reveal that V-notch flow rates from sandstones range between 0.15 L/s (78 m depth in bore E7550027R) and 5.0 L/s (126 m depth in bore E7550050R). Logs from monitoring bores, installed in 2004, penetrating the Leichardt seam indicate that it had yields ranging from moderate (2.17 L/s at 126 m in E755273P-C4) to very poor (0.03 L/s at 42 m in E755272P-C3).

Permeability of the late Permian units is hindered by the intercalation of sandstone with mudstone and siltstone, in contrast to the more permeable alluvium/colluvium and basalt aquifers (Matrix+, 2009). Generally, coal seams form high hydraulic conductivity zones within these systems, as the bedding planes, fractures, joints and cleats allow faster water movement compared to the surrounding sandstone and siltstone. The Leichardt seam has a hydraulic conductivity in the vicinity of 0.0005 m/day, about five times higher than that of the late Permian host rocks.

2.4.3.3 *Groundwater Flow in Late Permian Aquifers*

The regional flow patterns, recharge and discharge mechanisms of the Late Permian units of the Isaac River region are not well known or constrained. Considering the groundwater flow patterns in the overlying alluvium/colluvium and basalt, recharge to the late Permian rocks is expected to be restricted to wet periods, with several sequential wet periods required for effective recharge. In a previous groundwater review, C&R Consulting (C&R) surmised that a two-month cumulative rainfall total of approximately 400 mm is needed for recharge to occur in the nearby, overlying sandstone of the Triassic Rewan Formation (C&R, 2013). Recharge may occur through direct infiltration in areas where the late Permian rocks are exposed or close to the surface, and/or through inter-aquifer flow if vertical hydraulic gradients allow.

Very little is known about the variation of potentiometric water levels in the region with depth. However, there are available data that can constrain some details of vertical flow, as there is evidence for upward vertical gradients during winter to the south of IPC (Matrix+, 2009, their Section 7, Table 7-1). This indicates that some discharge may occur as upward flow from late Permian units into the overlying alluvium (or other sediment) and this may support baseflow to streams in winter months. A similar pattern may also exist near some creek reaches in the IPC area.

Given the aquifer characteristics, lateral flow within the coal measures is likely to be slow. Flow is assumed to be approximately south-eastward and southward, in keeping with the catchment orientation and the direction of Isaac River drainage. This is consistent with an interpolated map of groundwater levels in the region (Matrix+, 2009, their Section 7, page 13) and the data relevant to this review. Generally, groundwater ingress into the pits at Isaac Plains is minimal, confirming the slow-flow anticipated by the low permeability.

2.4.3.4 *Groundwater quality in Late Permian Aquifers*

Groundwater from the late Permian coal measures south of IPC is known to be of sodium-chloride-bicarbonate type and there is a trend of increasing solute concentration heading southwards (Matrix+, 2009, their Section 7, page 12). This confirms the assumption of regional groundwater flow from north to south, whereby length of residence time and degree of water-rock interaction increase along the flow path. The EC of groundwater in the late Permian aquifers ranges from 11,000 $\mu\text{S}/\text{cm}$ to 41,000 $\mu\text{S}/\text{cm}$, with an average EC of 21,000 $\mu\text{S}/\text{cm}$ (Matrix+, 2009, their Section 7, page 12).

The Leichardt coal seam may be termed an aquifer. However, the quality of the groundwater is generally poor, with an EC of 8,000 $\mu\text{S}/\text{cm}$ to 20,000 $\mu\text{S}/\text{cm}$. Based on the observed ECs, combined with poor to moderate flow rates and a thin expression (about 2 m thick), the Leichardt seam is an unusable aquifer (PW Baker & Associates, 2011; E3 Consulting Australia Pty Ltd, 2011).

2.5 GROUNDWATER-DEPENDENT ECOSYSTEMS

Groundwater-dependent ecosystems (GDEs) are defined by the Department of Environment and Energy (DoEE) as '*natural ecosystems that require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services*' (Richardson et al., 2011).

The broad types of GDEs are:

- Ecosystems dependent on surface expression of groundwater;
- Ecosystems dependent on subsurface presence of groundwater; and
- Subterranean ecosystems.



A review of the potential for GDEs in the vicinity of IPC was undertaken by Ecological Survey & Management (EcoSM) as part of the terrestrial ecology assessment to support the *Environmental Assessment Report – Isaac Plains East Project* (Hansen Bailey, 2016). EcoSM identified that the GDE mapping provided in the GDE atlas produced by the Australian Bureau of Meteorology is not consistent with the hydrogeological setting of the Isaac Plains area. EcoSM also states that the IPE area does not contain a suitable, shallow groundwater supply and, therefore, concludes that there are no GDEs within the vicinity of the project area.

In December 2020, Stanmore gained approval from the Australian Government Department of Agriculture, Water and the Environment to proceed with the Isaac Plains East Extension (IPEE). As part of the approvals process, Stanmore completed further studies into potential GDE's and subsequent impacts, within the project area which were completed by 3d Environmental (2020). Smoky Creek and Billy's Gully GDE were found to be at low to insignificant risk for all potential impact pathway resulting for the IPEE project. However, Stanmore has implemented mitigation measures under the Groundwater Dependent Ecosystem Management and Monitoring Plan (GDEMMP) (3d Environmental, 2020b). Four shallow bores, constructed in November 2020, target the alluvium besides Billy's Gully. The seasonality of these bores measures they are likely to produce water only during flow events in the wet season. The GDEMMP states, the imperatives of GDE monitoring bores are to:

- Confirm linkages between recharge of the alluvial aquifer and surface flows.
- Establish the period of saturation, including saturated thickness of the alluvial aquifer and lags in recharge following surface water flows.
- Identify natural; groundwater quality parameters to provide a baseline dataset for comparison to water quality of surface flows.
- Identify the degree to which the alluvial aquifer is utilised by vegetation (typically through analysis of stable isotopes) on a seasonal basis.
- Identify ecological response to aquifer recharge including correlations between alluvial aquifer recharge, LAI, LWP, NDVI and climate data.

3. GROUNDWATER MONITORING NETWORK

Previous to gaining environmental approval to mine the eastern mining leases at IPC (ML700016, ML700017, ML700018 and ML700019), only two groundwater bores (Burton Coal Bore 2 and Swamp Bore 1) were monitored as a requirement of the existing EA. Following the approval of an EA amendment (24 January 2018) for the mining activities on the additional leases, a more extensive monitoring network has been developed, targeting various aquifer systems present within the eastern mining leases. This 2018 monitoring network has been expanded with the release of the latest EA amendment (27 July 2020), to account for the replacement of existing monitoring bores that are due to be decommissioned.

The details of the bores included in the current IPC groundwater monitoring programme are summarised in Table 4, with their spatial distribution shown in Figure 4.

Historically, the groundwater network at IPC has consisted of both 'reference' and 'observation' bores. As mining has progressed to the east, some of these bores have been decommissioned and it is anticipated that further decommissioning will occur as mining advances further (Table 4). As twelve designated reference bores have been selected to provide ongoing baseline data during mine operations at IPC (Table 4), to maintain this number of designated reference bores, all decommissioned reference bores either have been or will be replaced. The current monitoring network at IPC consists of twelve reference bores and five observation bores (Table 4).

For the current IPC bore network, bore assessments were completed on Burton Coal Bore 2 and Swamp Bore 1 in June 2018, including downhole camera surveys to confirm bore construction details. The construction details of monitoring bores MB1, MB2, MB4a, MB4b, MB7, MB8, MB9, MB10, MB11, MB12 and MB14 were sourced from QLD Government 'Groundwater Information Bore Reports'.

Construction details of GDEMB1, GDEMB2, GDEMB3 and GDEMB4 were obtained from C&R, who recently installed these shallow (<5 m deep) observation bores that are not formally included in the groundwater management and monitoring plan (GMMP). The shallow GDE bores will be monitoring as per the GDEMMP (3d Environmental, 2020b).

At IPC, there are currently naming inconsistencies between the EA tables (Tables 11, 12, and 13), the GMMP and the field data. For instance:

- All field data referenced as MB9b refers to the bore stated within the EA as MB10.
- Swamp Bore 1 has been misnamed in the EA as Swamp Bore 2. Field verification has confirmed this.
- The hydrostratigraphic unit of MB4b is incorrectly referred to as the Rangal Coal Measures in the EA, although this shallow bore has been screened in the Quaternary sediments as per the bore report.

It is imperative that IPC amend all documents to align with a consistent naming convention for each monitoring bore to improve the integrity and reporting of the collected groundwater data.

Installation of monitoring bore MB11 was a requirement of Condition C42 of the IPC EA. Based on the regional geological mapping of the 1:250,000 Mount Coolon geology map sheet, the location of MB11 (identified in the EA) was anticipated to target the Quaternary alluvium. However, during the drilling of this bore, no alluvium was encountered. To date, no data have been captured for this bore as it has remained dry since installation (and, therefore, throughout the reporting period).



Table 4: Groundwater monitoring bores at IPC.

Monitoring Point	Aquifer Type	Easting (GDA 94)	Northing (GDA 94)	Surface RL (mAHD)	Monitoring Purpose
IPC Reference Bores (EA Table 11)					
Burton Coal Bore 2	Rewan Group	620383	7573599	240.8	Monitoring groundwater trigger levels as per EA C43 and EA C44
Swamp Bore 1 (referred to as Swamp Bore 2 in the EA)	Rewan Group	621518	7568790	245.9	Monitoring groundwater trigger levels as per EA C43 and EA C44
MB1	Rangal Coal Measures	618793	7572214	236.4	<u>To be decommissioned.</u> Used for monitoring groundwater in the target coal seam
MB2	Rangal Coal Measures	619074	7573137	242.7	Monitoring groundwater in the target coal seam
MB4a	Quaternary Colluvium / Tertiary Sediments	620351	7567479	237.6	<u>To be decommissioned.</u> Used for monitoring groundwater in the Quaternary / Tertiary sediments. Insufficient water, replaced by MB4b
MB4b	Quaternary Colluvium / Tertiary Sediments ¹	619740	7567253	233.9	<u>To be decommissioned.</u> Used for monitoring groundwater in the Quaternary / Tertiary sediments
MB8	Rangal Coal Measures	619105	7571149	245.9	<u>To be decommissioned.</u> Used for monitoring groundwater in the target coal seam
MB9	Rangal Coal Measures	620368	7568049	239.5	<u>To be decommissioned.</u> Used for monitoring groundwater in the target coal seam
MB10	Tertiary Basalt	620368	7568046	239.5	<u>To be decommissioned.</u> Used for monitoring groundwater in the Tertiary basalt
MB11	Tertiary Sediments / Weathered Rewan Group	618832	7571924	232.3	Monitoring groundwater in the Tertiary Sediments / Weathered Rewan Group. Insufficient water (dry)
MB12	Rangal Coal Measures	619210	7572000	239.5	<u>Replacement for MB1</u> to monitor groundwater in the target coal seam



Monitoring Point	Aquifer Type	Easting (GDA 94)	Northing (GDA 94)	Surface RL (mAHD)	Monitoring Purpose
MB14	Tertiary Basalt	620263	7571132	257.3	<i>Replacement for MB10 to monitor groundwater trigger levels as per EA C44</i>
IPC To Be Commissioned Reference Bores (EA Table 11)					
MB13	Rangal Coal Measures	619367	7571035	249.7	<i>Replacement for MB8 to monitor groundwater in the target coal seam</i>
MB15	Rangal Coal Measures	620633	7568080	242.9	<i>Replacement for MB9 to monitor groundwater in the target coal seam</i>
MB16	Tertiary Sediments	620670	7568599	245.6	<i>Replacement for MB4b to monitor trigger levels as per EA C44</i>
IPC Designated Observation Bores					
MB7	Rangal Coal Measures	617537	7569064	237.4	Monitoring groundwater in advance of mine operations
GDEMB01	Quaternary Alluvium	621780	7569179	TBA ²	Monitoring groundwater-dependent ecosystems
GDEMB02	Quaternary Alluvium	620436	7568168	TBA	Monitoring groundwater-dependent ecosystems
GDEMB03	Quaternary Alluvium	620022	7567230	TBA	Monitoring groundwater-dependent ecosystems
GDEMB04	Quaternary Alluvium	619754	7567165	TBA	Monitoring groundwater-dependent ecosystems
IPC Decommissioned Reference Bores (EA Table 11)					
MB3	Rangal Coal Measures	619047	7568473	253.0	Monitoring groundwater in advance of mine operations
IPC Decommissioned Observation Bores					
MB5	Rangal Coal Measures	618507	7570878	241.8	Monitoring groundwater in advance of mine operations
MB6	Tertiary Basalt	619374	7567545	235.7	Monitoring groundwater in the Tertiary basalt
C1	Rangal Coal Measures	616545	7571999	235.7	Monitoring groundwater in advance of mine operations
AC1	Rangal Coal Measures	616573	7571997	235.8	Monitoring groundwater in advance of mine operations
BC095	Rangal Coal Measures	616507	7571995	236.7	Monitoring groundwater in advance of mine operations

¹ MB4b has been screened in the Quaternary colluvium / Tertiary sediments as per the bore report. However, Table 11 of the EA states that the hydrostratigraphic unit is the Rangal Coal Measures.

² TBA = To be advised, as the bore has yet to be surveyed.

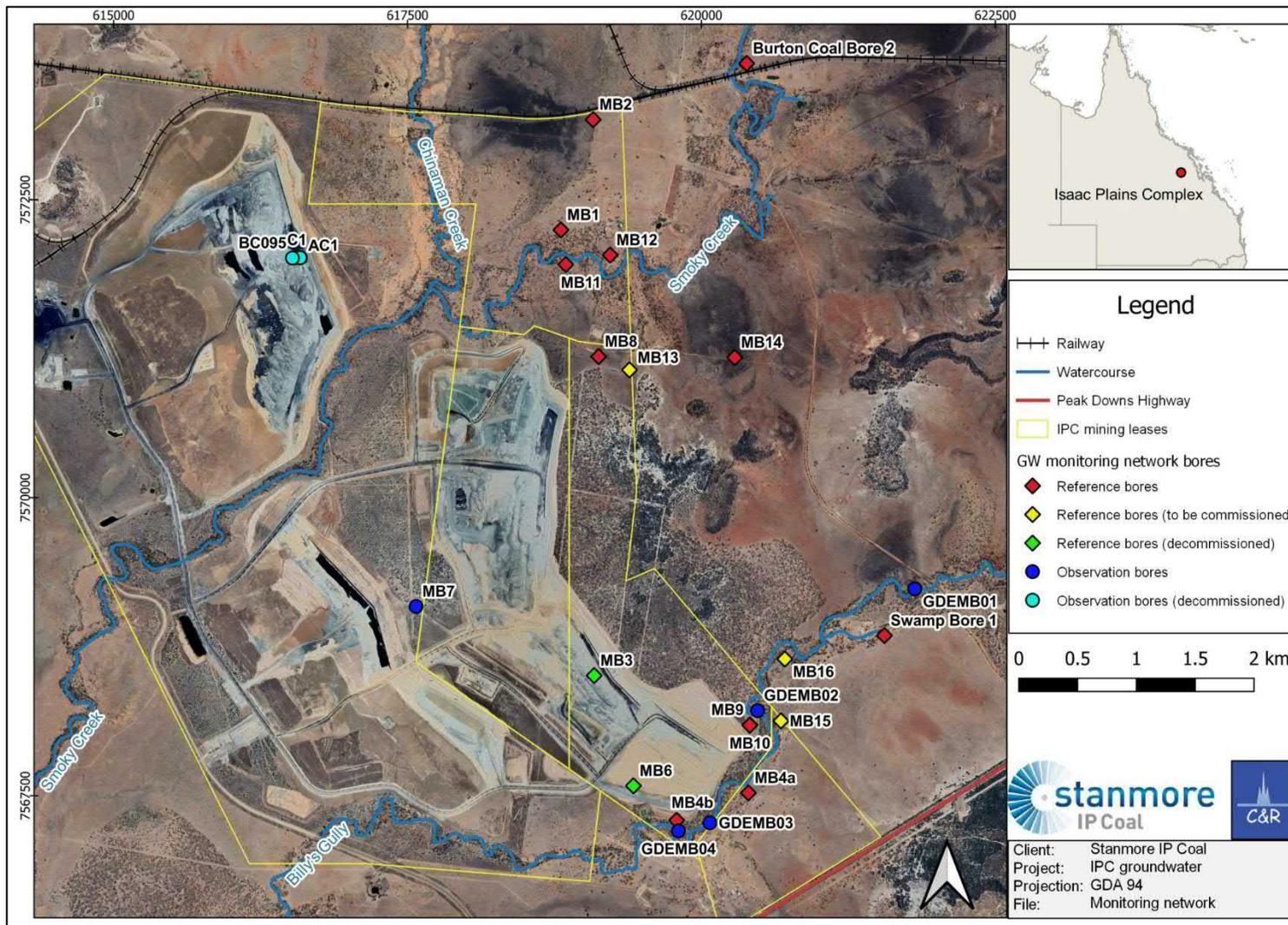


Figure 4: IPC groundwater monitoring network.



4. GROUNDWATER LEVELS

In accordance with EA Condition C40, IPC implemented the GMMP on 29 June 2019.

Standing water levels are measured as part of the groundwater monitoring procedure prior to undertaking water quality sampling. The measurement of standing water levels provides an insight into the nature of the aquifer systems (recharge and discharge points) and any potential impacts of mining activities. Standing water levels are captured by measuring the depth to water that is then subtracted from the reference datum height of the monitoring bore casing. This calculation provides the ability to gain a relative level in m Australian Height Datum (m AHD).

The reporting period for this annual review includes groundwater samples collected between May 2019 and December 2020 (inclusive), with results displayed in Figure 5.

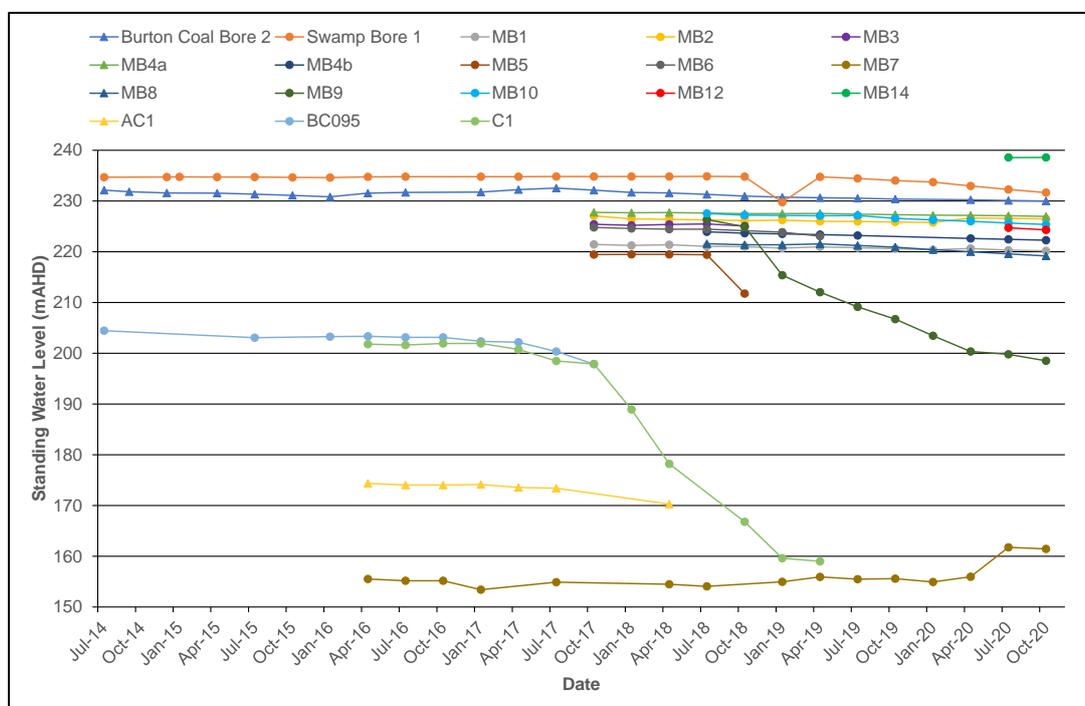


Figure 5: Standing water level variation across the groundwater monitoring network.

4.1 REWAN FORMATION

Burton Coal Bore 2 and Swamp Bore 1 are screened within the Rewan Formation and are situated to the northeast and east of IPC mining operations, respectively (Figure 4). Groundwater flow direction within the aquifer system suggests these bores are considered upstream of any potential groundwater impact that could be attributed to the IPC operation.

Throughout the reporting period, Burton Coal Bore 2 has remained stable, with very little variation in standing water level (Figure 5). In comparison, Swamp Bore 1 displays a steady downward trend over the reporting period, with the standing water level decreasing by 2.79 m (Figure 5). The downward trend in Swamp Bore 1 is likely to be caused by a dry period between 2018 and 2020, as well as groundwater extraction from the adjacent (<5 m away) farmer's bore that sources groundwater for stock-drinking water.

4.2 RANGAL COAL MEASURES

The IPC monitoring bores screened within the Rangal Coal Measures show a substantial variation in standing water level behaviour between monitoring bores (Figure 5). This variation is mainly attributed to the advancement of mining operations and the proximity of some bores to the open-cut voids.

Five bores, decommissioned prior to the current reporting period, displayed a significant drawdown in standing water levels (before being decommissioned). These bores include BC095, AC1, C1, MB3 and MB5 (Figure 5). Two operating reference bores, MB8 and MB9, displayed drawdowns of 2.07 m and 10.63 m respectively, during the reporting period. These standing water level decreases, in all of the aforementioned bores, can be attributed to a zone of depressurisation occurring around the mining voids that has consequently altered the flow direction of the coal seam aquifer. The presence of this zone of depressurisation existing around the mining voids is further evidenced by the reasonably steady standing water levels recorded in up-gradient monitoring bores MB1, MB2, MB12 and MB14. These bores are positioned further away from the open-cut voids (Figure 4).

Observation bore MB7 is located close to the highwall of the southern open-cut voids (Figure 4). The southern voids ceased full mining operations in 2018, whereby MB7 historically displayed steady standing water levels until April 2020 when the water level started to increase (Figure 5). During the reporting period, the standing water level in MB7 has increased by 5.94 m, responding to the increasing accumulation of stored water within the adjacent southern voids.

Note: MB8 and MB9 are respectively referred to as MB8b and MB9a within all field and analysis documentation.

4.3 TERTIARY BASALT

IPC currently monitor two bores that target the Tertiary Basalt aquifer. MB10 and MB14 are located south-east of mining operations and close to Billy's Gully (Figure 4). A third monitoring bore, MB6 was monitored between October 2017 and April 2019 before being decommissioned.

While operational, MB6 showed a steady decline in standing water level, with a total decrease of 1.72 m, associated with the progression of mining towards this down-gradient bore. Further, MB10 recorded a 1.77 m drawdown during the reporting period, also indicating a mining-induced water level decrease. MB14 was installed during the second quarter of 2020 and has only had two field measurements recorded so far, both of which are within 0.01 m of each other, indicating that this bore is effectively stable (Figure 5).

Note: MB10 is referred to as MB9b within all field and analysis documentation.

4.4 QUATERNARY COLLUVIUM / TERTIARY SEDIMENTS

MB4a and MB4b are screened within the boundary between the Quaternary colluvium and Tertiary sediments. The drawdown on both MB4a and MB4b is minor (0.45 m and 0.93 m, respectively), indicating that neither site is strongly affected by mining. As both bores are screened in shallow, unconsolidated sediments, the observed drawdown is more likely attributable to rainfall (given the dry period between 2018 and 2020). Monitoring bore MB11 is screened in the Tertiary sediments (and weathered Rewan Group) and has no standing water level data, as this bore was dry during commissioning (June 2018) and has remained so ever since.

CLIENT: STANMORE IP COAL PTY LTD
PROJECT: ISAAC PLAINS COMPLEX
REPORT: 2020 ANNUAL GROUNDWATER REVIEW
DATE: MAY 2021



Four shallow (<5 m deep) bores GDEMB01, GDEMB02, GDEMB03 and GDEMB04 were constructed and screened in the Quaternary alluvium during November/December 2020 to monitor GDEs. These bores were dry during construction and have remained so during the reporting period.

Note: The hydrostratigraphic unit for MB4b is incorrectly labelled as the Rangal Coal Measures in EA Table 11.

5. GROUNDWATER CHARACTERISTICS

The IPC groundwater monitoring network currently targets four different aquifer systems across and surrounding the mining operations at IPC, with a major focus on activities within the eastern mining leases. Each aquifer system (i.e. Rangal Coal Measures, Rewan Group, Tertiary basalt, Quaternary alluvium/colluvium) displays different groundwater quality. The variation in groundwater quality characteristics can be attributed to the aquifer depth, locality, geology and the nature of its recharge.

The reporting period for this annual review includes groundwater samples collected between May 2019 and December 2020 (inclusive), with the number of samples collected from each bore/aquifer presented in Table 5. Refer to Appendix 1 for all certificates of analyses referred to within this report.

Table 5: Number of samples collected per bore during the reporting period.

Monitoring Point	Aquifer Type	Number of Samples
EA Table 11 – Reference Bores		
Burton Coal Bore 2	Rewan Group	5
Swamp Bore 1	Rewan Group	6
MB1	Rangal Coal Measures	6
MB2	Rangal Coal Measures	6
MB4a	Quaternary Colluvium / Tertiary Sediments	6
MB4b	Quaternary Colluvium / Tertiary Sediments	3
MB8	Rangal Coal Measures	6
MB9	Rangal Coal Measures	6
MB10	Tertiary Basalt	6
MB11	Tertiary Sediments / Weathered Rewan Group	0
MB12	Rangal Coal Measures	2
MB14	Tertiary Basalt	2
IPC Designated Observation Bores		
MB7	Rangal Coal Measures	6
GDEMB01	Quaternary Alluvium	0
GDEMB02	Quaternary Alluvium	0
GDEMB03	Quaternary Alluvium	0
GDEMB04	Quaternary Alluvium	0

5.1 REWAN FORMATION

The two monitoring bores (Burton Coal Bore 2 and Swamp Bore 1) that target the Rewan Formation display very similar water quality characteristics in terms of pH, EC and total dissolved solids (TDS), substantiated by the low standard deviation (SD) and coefficient of variance (c_v) values presented in Table 6. Generally, the dissolved metal concentrations for both bores are similar, with most results below the limit of reporting (LOR).

Historically, Burton Coal Bore 2 has displayed a more diluted TDS concentration than Swamp Bore 1. However, over recent years (2017-2020), the geochemical difference has decreased, with the average divergence marginally above 500 mg/L over the current reporting period. During the reporting period, the lowest observed TDS value was 4,750 mg/L (Table 6). Consequently, both Swamp Bore 1 and Burton Coal Bore 2 do not meet the TDS livestock drinking water guideline value (<4,000 mg/L) stipulated within the Australian and New Zealand Environment and Conservation Council (ANZECC) and Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ; ANZECC and ARMCANZ, 2000).

5.2 RANGAL COAL MEASURES

The largest portion of the groundwater monitoring network (six monitoring bores) targets the Rangal Coal Measures within the IPC leases. Across the six monitoring bores, there is a large variation of screen depths, ranging from the shallowest (MB1) at 22.5 m depth to the deepest (MB12) starting at 126 m depth. This variation in screen depths (and depth of coal) is recognised as a significant influence of the varying water quality characteristics observed within the monitoring network, substantiated by the relatively high SD and c_v values (Table 6).

Generally, the water quality in the Rangal Coal Measures decreases below about 50 m, whereby the shallowest bore (MB1, screened at 22 m) has an average TDS value around 2,000 mg/L, whilst the second shallowest bore (MB2, screened at 48m) has an average TDS value of around 4,500 mg/L. All of the deeper bores (MB2, MB7, MB8, MB9 and MB12) have average TDS values ranging between approximately 7,500 mg/L and 15,500 mg/L. Interestingly, the highest TDS average (15,542 mg/L) is in a mid-level, 77 m deep bore (MB9), whilst some of the deeper bores (MB7 and MB12), screened at 126 m, have lower TDS averages of 7,411 mg/L and 9,000 mg/L, respectively.

Figure 6 displays the ionic composition variation within the Rangal Coal Measures, with MB1 and MB2 distinctly different from the other monitoring bores within the same aquifer. The total cation and anion levels recorded in MB1 and MB2 are consistently less than levels in the rest of the Rangal Coal Measures bores. MB1 and MB2 are both quite shallow, screened at 22 m and 48 m, respectively. Therefore, it is likely that the ionic composition is influenced by rainwater in these two bores, which is why they are different to the deeper bores. This observation that rainwater is influencing the bores is further substantiated by the fact that carbonate levels are elevated in both MB1 and MB2, whereas in the rest of the bores they are quite low (Figure 6). Regardless of this geochemical difference, of all the Rangal Coal Measures monitoring bores, only MB1 meets the TDS livestock drinking water guideline value (<4,000 mg/L) stipulated within ANZECC and ARMCANZ (2000).

Note: MB8 and MB9 are referred to as MB8b and MB9a, respectively, within all field and analysis documentation.

Table 6: Groundwater characteristics from each formation monitored over the reporting period.

Aquifer System		pH	Electrical Conductivity	Chloride	Sulphate	Calcium	Magnesium	Sodium	Potassium	TDS @180°C	Suspended Solids	Bicarbonate	Carbonate
	Unit		µS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	LOR	0.01	1	1	1	1	1	1	1	10	5	1	1
Rewan Group	Count	11	11	11	11	11	11	11	11	11	11	11	11
	Minimum	7.14	7,320	2,160	100	192	117	877	5	4,750	3	49	0.5
	Mean	7.47	8,292	2,743	115	393	200	1,029	14	5,622	4	323	0.5
	Maximum	8.18	9,150	3,160	130	600	311	1,170	23	6,800	12	700	0.5
	Standard Deviation	0.28	760	419	11	172	88	86	9	800	4	308	0
	Coefficient of Variance	4%	9%	15%	9%	44%	44%	8%	60%	14%	79%	96%	0%
Rangal Coal Measures	Count	32	32	32	32	32	32	32	32	32	32	32	32
	Minimum	7.07	3,210	817	1	80	95	416	3	1,860	3	97	0.5
	Mean	7.53	11,333	3,836	149	287	214	1,878	14	7,652	23	380	0.9
	Maximum	8.30	24,500	8,650	605	773	638	4,430	24	18,300	214	859	10
	Standard Deviation	0.29	6,400	2,423	185	190	155	1,124	7	4,776	45	250	1.8
	Coefficient of Variance	4%	56%	63%	124%	66%	72%	60%	52%	62%	170%	66%	195%
Quaternary Colluvium / Tertiary Sediments	Count	9	9	9	9	9	9	9	9	9	9	9	9
	Minimum	6.74	30,700	10,600	378	81	461	6,830	3	19,700	793	361	0.5
	Mean	7.35	44,822	16,689	759	465	1,455	8,939	3	34,233	7,693	649	2.4
	Maximum	8.31	53,100	19,900	983	730	2,130	10,700	5	47,900	35,400	1,270	18
	Standard Deviation	0.54	10,408	4,472	276	288	738	1,485	1	10,981	10,975	392	5.8
	Coefficient of Variance	7%	23%	27%	36%	62%	51%	17%	21%	32%	143%	60%	239%
Tertiary Basalt	Count	8	8	8	8	8	8	8	8	8	8	8	8
	Minimum	7.81	2,820	593	106	46	84	412	6	1,580	3	339	0.5
	Mean	8.04	3,429	862	117	61	114	504	9	2,000	18	427	5.8
	Maximum	8.53	4,300	1,140	130	80	135	665	12	2,520	64	582	43
	Standard Deviation	0.24	479	172	8	9	16	85	2	291	23	74	15
	Coefficient of Variance	3%	14%	20%	7%	16%	14%	17%	24%	15%	129%	17%	259%

Table 6 continued: Groundwater characteristics from each formation monitored at IPC over the reporting period.

Aquifer System		Dissolved Aluminium	Dissolved Antimony	Dissolved Arsenic	Dissolved Molybdenum	Dissolved Selenium	Dissolved Silver	Dissolved Iron	Dissolved Mercury	C6 - C9 Fraction	C10 - C36 Fraction (sum)
	Unit	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L
	LOR	0.01	0.001	0.001	0.001	0.01	0.001	0.05	0.0001	20	50
Rewan Group	Count	11	11	11	11	11	11	11	11	11	11
	Minimum	0.005	0.0005	0.0005	0.0005	0.005	0.0005	0.025	0.00005	10	25
	Mean	0.005	0.0005	0.0008	0.0009	0.005	0.0005	0.134	0.00005	10	25
	Maximum	0.005	0.0005	0.0020	0.0020	0.005	0.0005	0.540	0.00005	10	25
	Standard Deviation	0	0	0.0006	0.0006	0	0	0.172	0	0	0
	Coefficient of Variance	0%	0%	79%	69%	0%	0%	128%	0%	0%	0%
Rangal Coal Measures	Count	32	32	32	32	32	32	32	32	32	32
	Minimum	0.005	0.0005	0.0005	0.0005	0.005	0.0005	0.025	0.00005	10	25
	Mean	0.006	0.0005	0.0086	0.0032	0.005	0.0005	0.592	0.00005	10	25
	Maximum	0.03	0.0010	0.0320	0.0140	0.005	0.0005	2.520	0.00005	10	25
	Standard Deviation	0.004	0.0001	0.0109	0.0033	0	0	0.601	0	0	0
	Coefficient of Variance	76%	17%	127%	104%	0%	0%	101%	0%	0%	0%
Quaternary Colluvium / Tertiary Sediments	Count	9	9	9	9	9	9	9	9	9	9
	Minimum	0.025	0.0025	0.0025	0.0025	0.025	0.0025	0.025	0.00005	10	25
	Mean	0.056	0.0025	0.0025	0.0039	0.025	0.0025	0.038	0.00005	10	71
	Maximum	0.300	0.0025	0.0025	0.0080	0.025	0.0025	0.070	0.00005	10	380
	Standard Deviation	0.092	0	0	0.0022	0	0	0.019	0	0	117
	Coefficient of Variance	165%	0%	0%	57%	0%	0%	51%	0%	0%	166%
Tertiary Basalt	Count	8	8	8	8	8	8	8	8	8	8
	Minimum	0.005	0.0005	0.0010	0.0010	0.005	0.0005	0.025	0.00005	10	25
	Mean	0.006	0.0005	0.0025	0.0106	0.005	0.0005	0.032	0.00005	10	34
	Maximum	0.010	0.0005	0.0060	0.0150	0.005	0.0005	0.080	0.00005	10	100
	Standard Deviation	0.002	0	0.0018	0.0058	0	0	0.019	0	0	27
	Coefficient of Variance	31%	0%	71%	54%	0%	0%	61%	0%	0%	77%

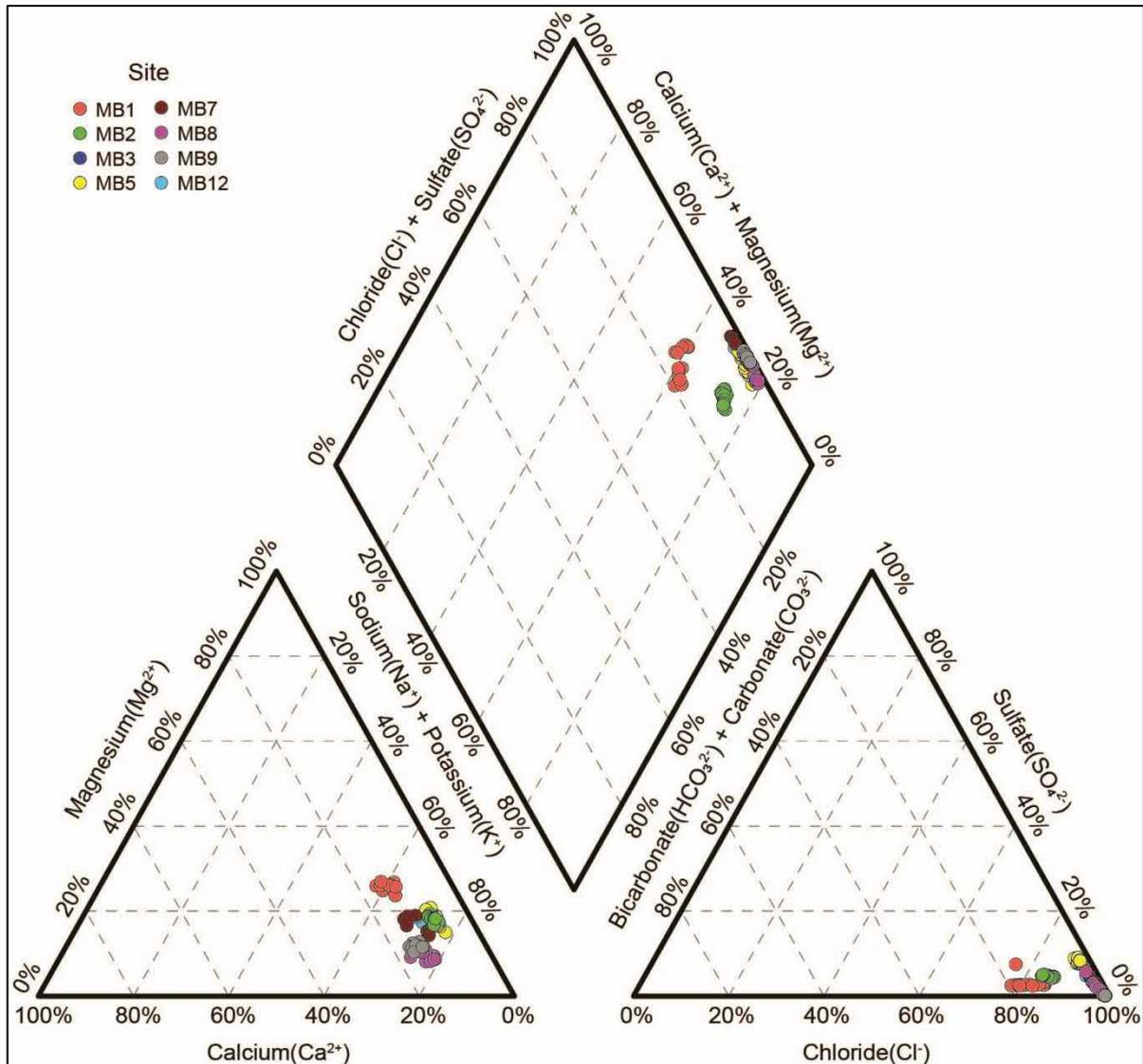


Figure 6: Difference in ionic composition of monitoring bores within the Rangal Coal Measures.

5.3 QUATERNARY COLLUVIUM / TERTIARY SEDIMENTS

Although there are seven monitoring bores in the Quaternary colluvium / Tertiary sediments at IPC, only two of these bores (MB4a and MB4b) actually contain water. Consequently, nine samples were taken in total (six from MB4a and three from MB4b). The two monitoring bores display similar water quality characteristics in terms of pH, EC and TDS, substantiated by the low SD and c_v values (Table 6). Generally, the dissolved metal concentrations for both bores are similar, with most results below the LOR.

MB4a recorded hydrocarbon concentrations above the LOR on two separate occasions during the reporting period. MB4a recorded 80 $\mu\text{g/L}$ within the C29–C36 fraction in July 2019. This hydrocarbon concentration is considered to be below the level of concern. In addition, all subsequent C29–C36 fraction results from this bore were below the LOR. MB4a recorded 380 $\mu\text{g/L}$ within the C10–C14 fraction in October 2020. It is unclear whether this measurement is due to contamination during sampling (as the sample was bailed) or attributable to the decomposition of organic matter. Because this elevated measurement



was the last of the reporting period, it is recommended that bore MB4a is monitored closely during the 2021 reporting period to provide further explanation of the result.

The water quality within the Quaternary/Tertiary sediments is poor, with TDS ranging between approximately 30,000 mg/L and 55,000 mg/L. Therefore, both MB4a and MB4b do not meet the TDS livestock drinking water guideline value (<4,000 mg/L) stipulated within the ANZECC and ARMCANZ (2000).

5.4 TERTIARY BASALT

The Tertiary basalt aquifer contains the best-quality groundwater across the IPC leases, with an average TDS of 2,000 mg/L (Table 6). Two monitoring bores (MB10 and MB14) target the basalt aquifer, with respective screen intervals of 21-27 m and 20-23 m. These two monitoring bores display similar water quality characteristics in terms of pH, EC and TDS, substantiated by the low SD and c_v values (Table 6). Generally, the dissolved metal concentrations for both bores are similar, with most results below the LOR.

MB14 recorded 100 µg/L within the C29–C36 fraction in July 2020. This measurement was recorded during the first sampling event after construction of the bore. It is therefore likely that the hydrocarbon was introduced during the construction process. This measurement is not of concern, also all hydrocarbon concentrations were recorded below LOR in the subsequent sampling event (October 2020).

The water quality within the Tertiary basalt is better than all of the other aquifers at IPC, with TDS ranges between approximately 1,000 mg/L and 2,500 mg/L. Therefore, both MB10 and MB14 meet the TDS livestock drinking water guideline value (<4,000 mg/L) stipulated within the ANZECC and ARMCANZ (2000).

Note: MB10 is referred to as MB9b within all field and analysis documentation.



6. EA COMPLIANCE

6.1 GROUNDWATER LEVELS

The IPC EA requires standing water level to be measured on a quarterly basis. Condition C44 states:

*If groundwater levels for the bores identified in **Table 13: Groundwater level monitoring** exceed any of the trigger level thresholds identified in **Table 13: Groundwater level monitoring** the environmental authority holder must:*

- a) *notify the administering authority via WaTERS or the pollution hotline within seven (7) days of receiving the analysis results;*
- b) *complete an investigation into the potential for environmental harm.*

Table 7: Groundwater level fluctuation trigger threshold (EA Table 13).

Monitoring Location	Trigger Level Threshold (m)	Monitored Unit
Burton Coal Bore 2	2	Rewan Group
Swamp Bore 1 ¹	5	Rewan Group
MB14	1	Tertiary Basalt
MB16 ²	5	Tertiary Sediments

¹ Swamp Bore 1 is referred to as Swamp Bore 2 in EA Table 13.

² MB16 constructed late April 2021.

The compliance assessment against triggers stipulated within Table 7 only takes into consideration standing water levels measured in the reporting period between May 2019 and December 2020. Burton Coal Bore 2, Swamp Bore 1 and MB14 fluctuated by 0.57 m, 2.79 m and 0.01 m, respectively. Therefore, in accordance with EA Condition C44, IPC did not exceed the fluctuation trigger thresholds for any of the mandated monitoring bores (Figure 7).

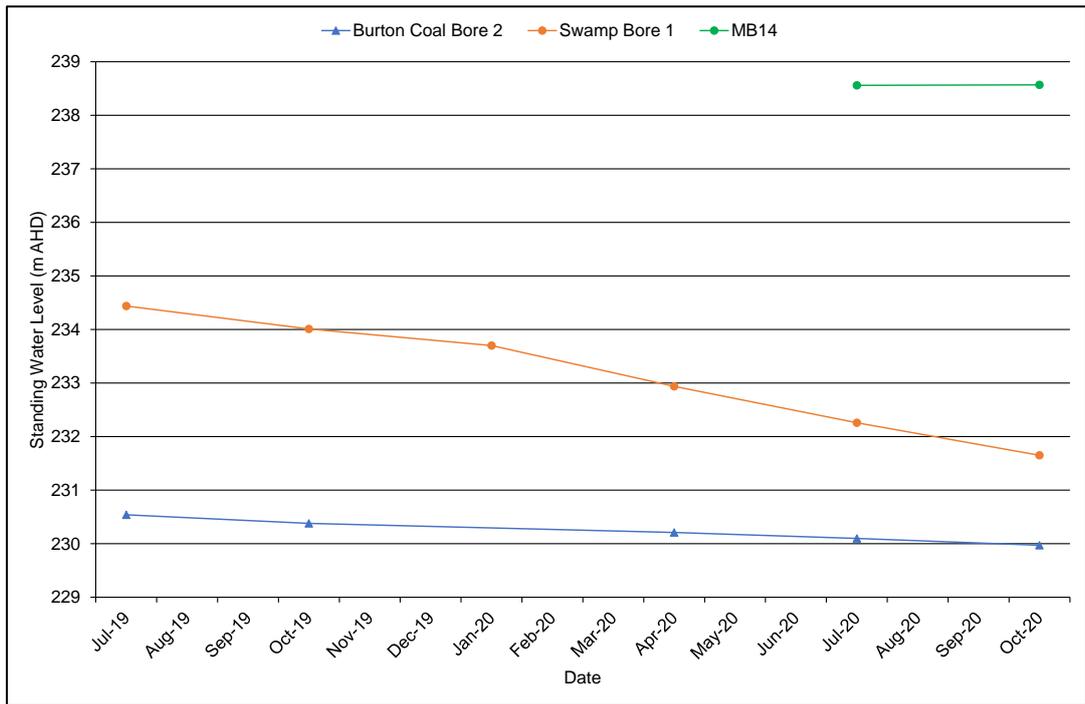


Figure 7: Groundwater level fluctuations for applicable monitoring bores.

6.2 GROUNDWATER CHARACTERISTICS

The IPC EA requires groundwater quality characteristics to be determined on a quarterly basis. Condition **C43** states:

*If groundwater quality characteristics in Burton Coal Bore 2 or Swamp Bore 1 exceed any of the trigger levels identified in **Table 12: Groundwater contaminant triggers** the environmental authority holder must:*

- a) *notify the administering authority via WaTERS or the pollution hotline within seven (7) days of receiving the analysis results;*
- b) *complete an investigation into the potential for environmental harm.*

The compliance assessment against triggers stipulated in Table 8 and Table 9 only takes into consideration groundwater quality characteristics measured in the reporting period (between May 2019 and December 2020).

Table 8: Burton Coal Bore 2 water quality and compliance with EA Table 12. Exceedances are highlighted in red and bold font.

Parameter	Unit	LOR	EA Contaminant Trigger	23/07/2019	22/10/2019	28/04/2020	22/07/2020	26/10/2020
pH	pH units	0.01	7.0 < > 8.3	7.14	7.43	8.18	7.45	7.2
EC	µS/cm	1	7320	7,320	7,430	7,520	7,660	7,620
Chloride	mg/L	1	2050	2,160	2,280	2,310	2,290	2,540
Sulphate	mg/L	1	130	112	100	105	110	101
Calcium	mg/L	1	195	213	192	193	245	233
Magnesium	mg/L	1	265	286	274	287	299	311
Sodium	mg/L	1	990	955	877	932	1010	990
Potassium	mg/L	1	8	5	5	5	6	6
TDS @ 180°C	mg/L	10	4500	4,940	4,790	4,770	4,750	5,020
TSS	mg/L	5	52	BLOR	BLOR	BLOR	BLOR	12
Bicarbonate	mg/L	1	820	700	616	645	648	609
Carbonate	mg/L	1	7	BLOR	BLOR	BLOR	BLOR	BLOR
Aluminum	mg/L	0.01	0.01	BLOR	BLOR	BLOR	BLOR	BLOR
Antimony	mg/L	0.001	0.001	BLOR	BLOR	BLOR	BLOR	BLOR
Arsenic	mg/L	0.001	0.004	BLOR	BLOR	0.002	BLOR	BLOR
Molybdenum	mg/L	0.001	0.001	BLOR	BLOR	BLOR	BLOR	BLOR
Selenium	mg/L	0.01	0.01	BLOR	BLOR	BLOR	BLOR	BLOR
Silver	mg/L	0.001	0.001	BLOR	BLOR	BLOR	BLOR	BLOR
Iron	mg/L	0.05	0.23	BLOR	BLOR	BLOR	BLOR	BLOR
Mercury	mg/L	0.0001	0.0001	BLOR	BLOR	BLOR	BLOR	BLOR
C6 - C9 Fraction	µg/L	20	20	BLOR	BLOR	BLOR	BLOR	BLOR
C10 - C36 Fraction (sum)	µg/L	50	50	BLOR	BLOR	BLOR	BLOR	BLOR

BLOR = Below the limit of reporting.

Table 9: Swamp Bore 1 water quality and compliance with EA Table 12. Exceedances are highlighted in red and bold font.

Parameter	Unit	LOR	EA Contaminant Trigger	23/07/2019	22/10/2019	21/01/2020	28/04/2020	22/07/2020	26/10/2020
pH	pH units	0.01	7.1 < > 7.8	7.39	7.46	7.44	7.70	7.50	7.30
EC	µS/cm	1	9500	9,010	8,780	8,860	9,150	9,010	8,850
Chloride	mg/L	1	3500	3,160	3,050	3,110	3,140	3,030	3,100
Sulphate	mg/L	1	150	130	113	128	121	130	119
Calcium	mg/L	1	580	556	520	520	515	600	536
Magnesium	mg/L	1	165	125	117	117	122	126	132
Sodium	mg/L	1	1275	1,100	1,050	1,060	1,070	1,170	1,110
Potassium	mg/L	1	25	22	21	21	21	23	22
TDS @ 180°C	mg/L	10	7585	6,800	6,380	6,430	6,460	5,890	5,610
TSS	mg/L	5	37	BLOR	BLOR	10	7	BLOR	BLOR
Bicarbonate	mg/L	1	94	56	49	57	67	52	49
Carbonate	mg/L	1	1	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Aluminum	mg/L	0.01	0.01	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Antimony	mg/L	0.001	0.001	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Arsenic	mg/L	0.001	0.002	BLOR	BLOR	BLOR	BLOR	BLOR	0.002
Molybdenum	mg/L	0.001	0.001	BLOR	0.001	0.002	BLOR	0.001	0.002
Selenium	mg/L	0.01	0.01	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Silver	mg/L	0.001	0.001	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Iron	mg/L	0.05	1.00	0.28	0.28	0.20	0.54	BLOR	BLOR
Mercury	mg/L	0.0001	0.0001	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
C6 - C9 Fraction	µg/L	20	20	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
C10 - C36 Fraction (sum)	µg/L	50	50	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR

BLOR = Below the limit of reporting.

6.2.1 BURTON COAL BORE 2

The water quality of Burton Coal Bore 2 has been assessed against the groundwater contaminant trigger levels stipulated within EA Table 12 (Table 8). Numerous groundwater contaminant limits have been exceeded during the reporting period, with values surpassing designated limits (Table 8). It can be established that these exceedances are inter-related and associated with natural processes and climatic conditions (increased evapotranspiration / decreased rainfall), and are not a result of mining impacts (Appendix 2).

In recent years, the TDS within Burton Coal Bore 2 has been steadily increasing, with concentrations at 2,160 mg/L in October 2017 and at 5,020 mg/L in October 2020, an overall increase of 2,860 mg/L (Figure 8). This increase in TDS is an indication of a change within the cation and anion balance within the groundwater supplying Burton Coal Bore 2. The progression of this concentration can be tracked through the use of the Piper diagram (Figure 9), with data points separated into the year of collection.

Figure 9 shows that the Burton Coal Bore 2 is consistent with a sodium-chloride water type, although the ratio of these two elements has altered between 2010 and 2019. Water quality analyses performed in the initial years of IPC display similar concentrations of sodium and chloride. However, the composition has altered in recent years, displaying a chloride-dominated system, with sodium providing a lesser share of the ionic balance. Therefore, it is not unusual that the recent exceedances in the Burton Coal Bore 2 (Table 8) all relate to increases in TDS, EC, cation and anion levels.

Results from a Pearson correlation analysis reveal that the observed trends in TDS are significantly and inversely correlated to the standing water levels ($r = -0.92$, $n = 32$, $p < 0.001$). This correlation is evident in Figure 8, showing a clear relationship between the TDS and standing water level (note: values for standing water level were reversed for visual purposes). Given this correlation, it is expected that the recent dry period (2018-2020) has had the effect of concentrating the dissolved solids in the aquifer system. The increasing trend of TDS concentrations indicates that water is being lost from the system (confirmed by the SWL decline), whilst dissolved salts remain and are more concentrated due to reduced dilution.

The observed trends in TDS, EC, ionic concentrations and standing water level are highly indicative of evapotranspiration processes (sum of evaporation and plant transpiration). Burton Coal Bore 2 is located within the riparian corridor of Smoky Creek, surrounded by remnant vegetation consisting of large, deep-rooted trees. Standing water levels in the bore are known to be relatively shallow, with water levels as shallow as 7.27 m below ground level. The combination of deep tree roots and capillary action can draw water from depths (accounting for the water loss), in turn lowering the zone of saturation and concentrating salts.

The current increasing trend in TDS, EC, cation and anion levels is therefore inferred to be an expression of the climatic conditions in the area, and not a result of IPC mining activities. The groundwater contaminant limits for Burton Coal Bore 2 need to be recalculated to allow for such natural variations.

No other parameters exceeded the contaminant trigger values for Burton Coal Bore 2 during the reporting period (Table 8).

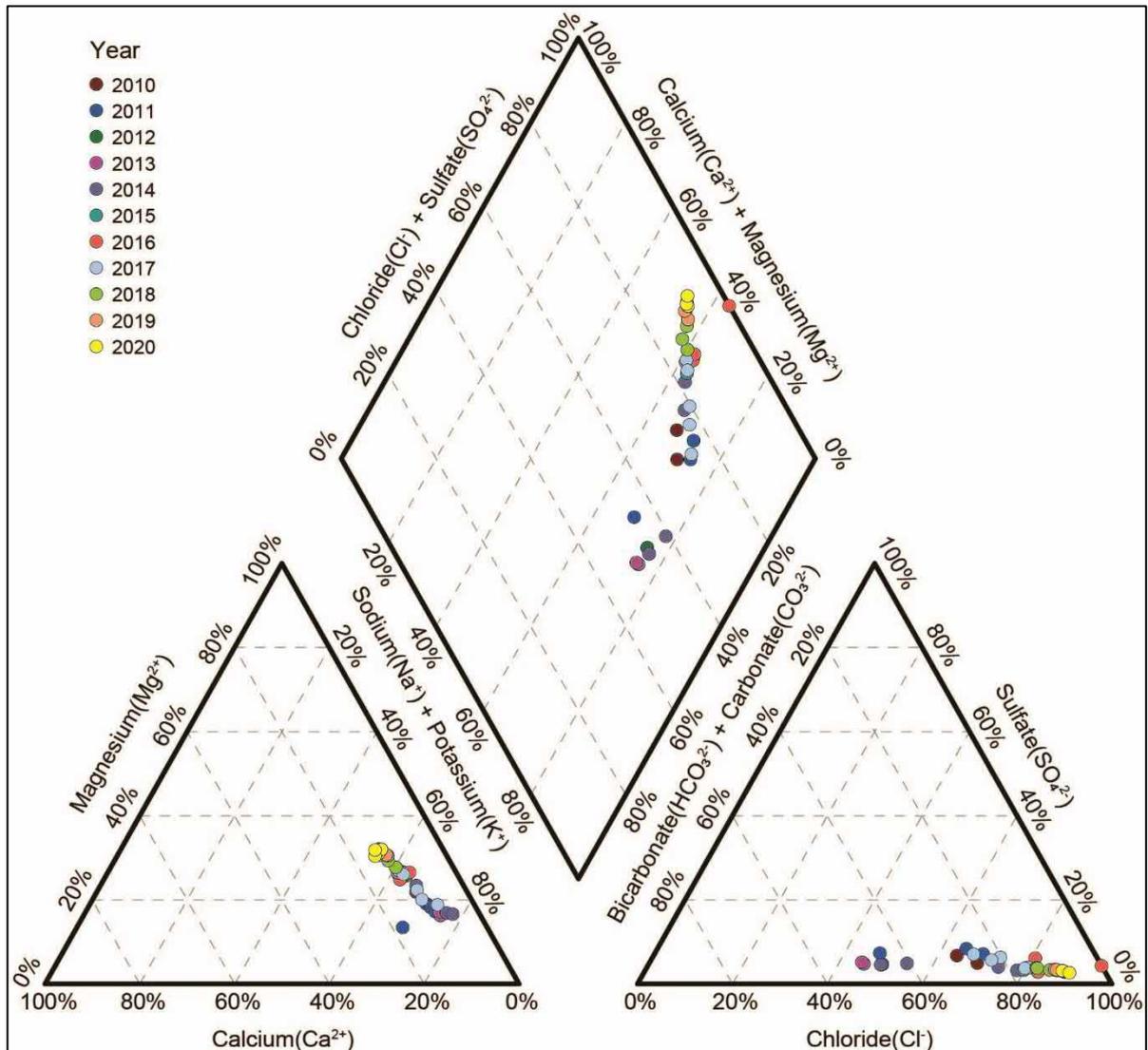


Figure 9: Ionic composition variation within Burton Coal Bore 2.

6.2.2 SWAMP BORE 1

The water quality of Swamp Bore 1 has been assessed against the groundwater contaminant trigger levels stipulated for the bore in EA Table 12 (Table 9). Few groundwater contaminant limits have been exceeded during the reporting period. All of the exceedances are either at the trigger level or only marginally above it. Therefore, it is assumed that the exceedances are natural variations within the groundwater and not a result of mining impacts.

Five exceedances occurred in dissolved metal concentrations during the reporting period, four of these for molybdenum and one for arsenic (Table 9). Two of the molybdenum exceedances were at the EA molybdenum trigger level of 0.001 mg/L, corresponding to the LOR for dissolved molybdenum. The other two molybdenum exceedances were at 0.002 mg/L. The single arsenic exceedance is at the EA arsenic trigger level of 0.002 mg/L and only marginally above the dissolved arsenic LOR of 0.001 mg/L. Given all of these exceedances are either at, or marginally above the LOR for dissolved molybdenum and dissolved arsenic, they are still within the limits of analytical uncertainty. Therefore, the aforementioned dissolved metal results may not actually be exceedances, but potential anomalies in the individual analyses.

Calcium exceeded the EA calcium trigger level (580 mg/L) in July 2020, with a value of 600 mg/L recorded (Table 9). Swamp Bore 1 has an extensive monitoring history (37 data points), with results dating back to 2010. Whilst measurements above 580 mg/L are sporadic, they are not uncommon (19% above the trigger level). In addition, the historic water composition within Swamp Bore 1 remains in a tight cluster (Figure 10). Therefore, the (marginal) exceedance of the contaminant trigger limit for calcium is attributed to natural variation observed in the groundwater system, and not a potential influence from mining activities.

No other parameters exceeded the contaminant trigger values for Swamp Bore 1 during the reporting period (Table 9).

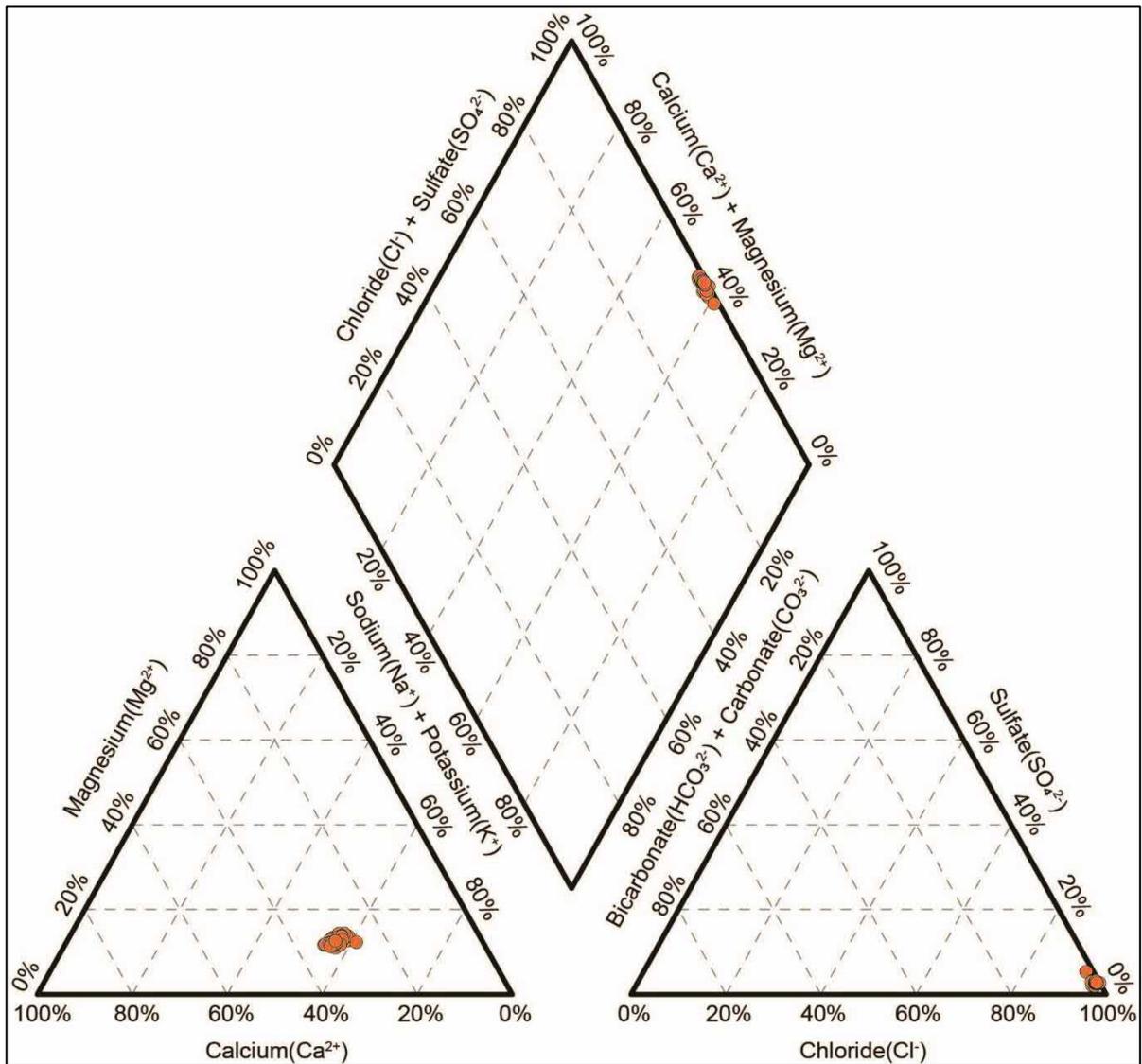


Figure 10: Ionic composition of Swamp Bore 1.



7. GROUNDWATER TRIGGER VALUES

The current EA *Table 12: Groundwater contaminant triggers* were developed for Swamp Bore 1 and Burton Coal Bore 2 from historical data collected between September 2013 and April 2019. The trigger values were determined by calculating the 80th percentile plus one standard deviation, and then rounding the result to the nearest significant figure. Subsequent monitoring has been able to provide an additional six data points for Swamp Bore 1, with a total sample size of 29 data points, and five additional datapoints for Burton Coal Bore 2, with a total sample size of 28 data points.

Upon review of the dataset, most parameters for Swamp Bore 1 have not changed. Therefore, it is deemed that the Swamp Bore 1 EA triggers levels are appropriate. Conversely, Burton Coal Bore 2 displays an increasing trend in TDS, EC and associated cations and anions. This trend can be attributed to climatic conditions and natural processes (refer to Section 6.2.1). As such, it is recommended that the EA groundwater trigger levels be amended to account for these changes in Burton Coal Bore 2. The proposed EA amendments provided in Table 10 have been determined by calculating the 80th percentile plus one standard deviation for the 28 Burton Coal Bore 2 data points (from September 2013 to October 2020), with the resulting value rounded to the nearest significant figure.



Table 10: Proposed updates to EA Table 12 Groundwater contaminant triggers. Changes are highlighted in blue and bold font.

Parameter	Unit	LOR	Burton Coal Bore 2	
			Current Trigger Values	Amended Trigger Values
pH	pH units	0.01	7.0 < > 8.3	7.0 < > 8.3
EC	µS/cm	1	7320	9020
Chloride	mg/L	1	2050	2780
Sulphate	mg/L	1	130	130
Calcium	mg/L	1	195	260
Magnesium	mg/L	1	265	360
Sodium	mg/L	1	990	1110
Potassium	mg/L	1	8	8
TDS @180°C	mg/L	10	4500	5560
TSS	mg/L	5	52	52
Bicarbonate	mg/L	1	820	820
Carbonate	mg/L	1	7	7
Aluminum	mg/L	0.01	0.01	0.01
Antimony	mg/L	0.001	0.001	0.001
Arsenic	mg/L	0.001	0.004	0.004
Molybdenum	mg/L	0.001	0.001	0.001
Selenium	mg/L	0.01	0.01	0.01
Silver	mg/L	0.001	0.001	0.001
Iron	mg/L	0.05	0.23	0.23
Mercury	mg/L	0.0001	0.0001	0.0001
C6 - C9 Fraction	µg/L	20	20	20
C10 - C36 Fraction (sum)	µg/L	50	50	50

8. CONCLUSION AND RECOMMENDATIONS

The 2020 IPC groundwater review incorporates all groundwater data collected from May 2019 to December 2020 (inclusive). This groundwater review is based on the existing groundwater network, incorporating twelve reference bores and five observation bores, targeting multiple aquifer systems, including the Rangal Coal Measures, Rewan Group, Tertiary basalt, Tertiary sediments and Quaternary alluvium/colluvium.

Groundwater level monitoring was conducted in all bores, exposing a steady decline in standing water level in most bores (refer to Section 0). This general decline is attributed to the ongoing dry period (2018-2020). Several bores in the Rangal Coal Measures displayed a substantial decline in standing water level as mining activities approached. This was anticipated and most of these bores were decommissioned and replaced by new bores further afield. Groundwater level triggers referenced in the IPC EA only apply to three existing bores (with the fourth and final bore recently installed in late April 2021). These include Swamp Bore 1, Burton Coal Bore 2 and MB14. IPC did not exceed the fluctuation trigger threshold for any of these EA-mandated water level monitoring bores (refer to Section 6.1).

Monitoring of groundwater quality characteristics was conducted in all bores, targeting multiple aquifer systems, with the best-quality water contained within the Tertiary basalt. The Tertiary basalt meets the TDS livestock drinking water guideline value (<4,000 mg/L) stipulated within ANZECC and ARMCANZ (2000), whereas all the other systems do not meet this threshold. For the first sampling event in a recently constructed Tertiary basalt bore (MB14), a hydrocarbon concentration of 100 µg/L was measured in the C29–C36 fraction. This concentration is deemed below the level of concern and was most likely caused by the construction process. Further, the subsequent sampling event at MB14 recorded all hydrocarbon concentrations below the LOR.

The highest TDS (and, consequently, EC) is contained within the Quaternary colluvium / Tertiary sediments, with all values above 19,000 mg/L. Therefore, the water quality is considered poor. In addition, one of the Quaternary colluvium / Tertiary sediment monitoring bores (MB4a) recorded two separate hydrocarbon concentrations at or above the LOR during the reporting period. The first measurement of 80 µg/L within the C29–C36 fraction (July 2019) is below the level of concern, especially as subsequent sampling rounds returned concentrations below detection limits. Conversely, the second measurement of 380 µg/L within the C10–C14 fraction (October 2020) is potentially of concern. It is recommended that bore MB4a is monitored closely during the 2021 reporting period to provide further explanation of the result, with the elevated concentration possibly resulting from either contamination during sampling or decomposition of organic material.

Trigger levels of groundwater quality characteristics, referenced in the IPC EA, apply to only two bores (Swamp Bore 1 and Burton Coal Bore 2), both of which are screened within the Rewan Group. Swamp Bore 1 recorded six exceedances of the trigger threshold, one for calcium and five for dissolved metals (four exceedances for molybdenum and one for arsenic). The calcium exceedance is only marginally (20 mg/L) above the threshold and most likely attributable to natural variation within the groundwater. The dissolved metal exceedances are also minimal (either at or slightly above the LOR), and are within the limits of analytical uncertainty, requiring further monitoring to decipher whether or not contamination is occurring. The second bore, Burton Coal Bore 2, recorded numerous exceedances of trigger values associated with TDS, EC and ionic concentrations. However, these exceedances are all interrelated and associated with natural processes and climatic conditions (refer to Section 6.2.1).

In recent years, the TDS, EC and ionic concentrations within Burton Coal Bore 2 have been steadily increasing. Therefore, it is not unexpected that all of the exceedances of



groundwater quality characteristic at Burton Coal Bore 2 during the reporting period are attributed to these interrelated parameters. The increase in TDS (and, consequently, EC) is indicative of a change within the cation and anion balance within the groundwater surrounding Burton Coal Bore 2. These increases can be directly related to the decline in standing water level in Burton Coal Bore 2 (refer to Section 6.2.1). Therefore, it is expected that the recent dry period (2018-2020) has had the effect of concentrating the dissolved solids in the aquifer system during a concomitant decrease in water volume. Therefore, the observed trends in TDS, EC, ionic concentrations and standing water level in Burton Coal Bore 2 are symptomatic of natural evapotranspirative processes and recent climatic conditions.

The groundwater contaminant limits for Burton Coal Bore 2 need to be recalculated to allow for the aforementioned natural processes. Updated groundwater contaminant limits have been ascertained for Burton Coal Bore 2, adopting the same method utilised for the original values (80th percentile plus one standard deviation, rounded to the nearest significant figure). These updates to the contaminant limits were calculated using a larger, more representative dataset, containing an additional 20 months of results from the 2019-2020 reporting period. Although the dataset is more representative, the calculation methodology used for the trigger values remains stringent and, consequently, IPC may continue to exceed the site-specific limits (especially in the case of Burton Coal Bore 2). If continual exceedances are recorded, it is recommended that IPC discuss a trigger level review with DES. Such a review may include undertaking further groundwater assessments or the possible application of a different calculation method when determining contaminant trigger limits.

Whilst unrelated to EA compliance, it must be noted that the current monitoring network nomenclature is not aligned across the relevant documentation, including the EA, GMMP and third-party groundwater sample reports (refer to Section 3). To maintain the integrity of the data collected, it is highly recommended that the naming conventions be addressed immediately and aligned within all relevant documentation. Alignment of monitoring bore details should include surveyed coordinate locations, surveyed reduced levels (in m AHD) for surface and top of casing levels, hydrostratigraphic unit, screened interval, and a standardised naming identification. C&R understands that this recommendation has been addressed in the latest EA amendment completed by Stanmore.

The IPC groundwater monitoring network extensively covers the aquifer systems that may be potentially impacted by mining operations and therefore meets the requirements stipulated in EA Condition C40.



9. REFERENCES

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- 3d Environmental (2020a) *Isaac Plains East Extension Project – Groundwater Dependent Ecosystem (GDE) Management and Monitoring Plan*. For Stanmore IP Coal Pty Ltd.
- 3d Environmental (2020b) *Isaac Plains East Extension Project – Groundwater Dependent Ecosystem Assessment*. For Stanmore IP Coal Pty Ltd.

CLIENT: STANMORE IP COAL PTY LTD
PROJECT: ISAAC PLAINS COMPLEX
REPORT: 2020 ANNUAL GROUNDWATER REVIEW
DATE: MAY 2021



Appendix 1 – Certificate of Analysis

CERTIFICATE OF ANALYSIS

Work Order : **EB1918178**
Client : **STANMORE IP COAL PTY LTD**
Contact : BELINDA PARFITT
Address : GPO BOX 2602
 BRISBANE QLD 4001
Telephone : 07 4816 7444
Project : IPCM
Order number : P1002091
C-O-C number : ----
Sampler : SCOTT AULSEBROOK
Site : ----
Quote number : TV/005/19
No. of samples received : 17
No. of samples analysed : 11

Page : 1 of 12
Laboratory : Environmental Division Brisbane
Contact : Anna Riddell
Address : 2 Byth Street Stafford QLD Australia 4053

Telephone : +61 7 4952 5795
Date Samples Received : 26-Jul-2019 09:30
Date Analysis Commenced : 26-Jul-2019
Issue Date : 05-Aug-2019 12:27



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Organic Chemist	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Ek067G (Total Phosphorus as P): Sample EB1918178_004 (MB7) was diluted due to matrix interference. LOR adjusted accordingly.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EG035T (Total Mercury): Positive mercury results have been confirmed by re-extraction and re-analysis.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised for some samples due to matrix interference.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BC2	SB1	MB7	MB1	MB2
Client sampling date / time				23-Jul-2019 07:30	23-Jul-2019 16:00	24-Jul-2019 10:30	23-Jul-2019 10:00	23-Jul-2019 08:55	
Compound	CAS Number	LOR	Unit	EB1918178-001	EB1918178-002	EB1918178-004	EB1918178-006	EB1918178-007	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.14	7.39	7.07	7.33	7.25	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	7320	9010	24100	3420	7870	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	4940	6800	17700	1890	4550	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	<5	19	<5	16	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	700	56	490	581	859	
Total Alkalinity as CaCO3	----	1	mg/L	700	56	490	581	859	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	112	130	556	35	167	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	2160	3160	8440	827	2540	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	213	556	717	88	132	
Magnesium	7439-95-4	1	mg/L	286	125	555	104	173	
Sodium	7440-23-5	1	mg/L	955	1100	3930	483	1310	
Potassium	7440-09-7	1	mg/L	5	22	21	3	8	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.03	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.007	0.032	
Barium	7440-39-3	0.001	mg/L	0.104	0.205	0.357	0.128	0.136	
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.014	0.001	0.002	
Rubidium	7440-17-7	0.001	mg/L	0.010	0.034	0.037	0.003	0.013	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	5.49	8.50	46.0	2.14	4.48	
Iron	7439-89-6	0.05	mg/L	<0.05	0.28	0.55	0.15	1.69	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.04	0.15	0.01	0.13	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BC2	SB1	MB7	MB1	MB2
Client sampling date / time					23-Jul-2019 07:30	23-Jul-2019 16:00	24-Jul-2019 10:30	23-Jul-2019 10:00	23-Jul-2019 08:55
Compound	CAS Number	LOR	Unit		EB1918178-001	EB1918178-002	EB1918178-004	EB1918178-006	EB1918178-007
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		110	121	113	119	108
Toluene-D8	2037-26-5	2	%		98.6	93.6	97.1	95.9	98.3
4-Bromofluorobenzene	460-00-4	2	%		94.9	96.8	97.0	99.9	96.2



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time				24-Jul-2019 07:00	23-Jul-2019 17:30	23-Jul-2019 11:55	23-Jul-2019 16:05	23-Jul-2019 17:00	
Compound	CAS Number	LOR	Unit	EB1918178-009	EB1918178-010	EB1918178-013	EB1918178-014	EB1918178-015	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.82	7.57	7.43	7.51	7.87	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	53100	31500	12300	11000	2820	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	41500	19900	8090	7600	1580	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	7530	7480	6	23	6	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	437	1270	219	106	582	
Total Alkalinity as CaCO3	----	1	mg/L	437	1270	219	106	582	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	965	401	130	1	130	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	19500	10600	4270	3890	593	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	643	90	314	316	46	
Magnesium	7439-95-4	1	mg/L	1940	461	114	138	84	
Sodium	7440-23-5	1	mg/L	10300	7240	2070	1660	412	
Potassium	7440-09-7	1	mg/L	3	3	13	19	6	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	0.01	
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.003	<0.001	0.002	
Barium	7440-39-3	0.001	mg/L	0.257	0.213	0.682	9.29	0.030	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	<0.005	0.004	<0.001	0.014	
Rubidium	7440-17-7	0.001	mg/L	0.005	<0.005	0.025	0.030	0.011	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	22.0	7.06	20.3	13.2	0.881	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.11	0.70	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	36.6	57.3	0.48	1.70	0.19	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time				24-Jul-2019 07:00	23-Jul-2019 17:30	23-Jul-2019 11:55	23-Jul-2019 16:05	23-Jul-2019 17:00	
Compound	CAS Number	LOR	Unit	EB1918178-009	EB1918178-010	EB1918178-013	EB1918178-014	EB1918178-015	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.031	0.018	0.004	0.003	0.002	
Barium	7440-39-3	0.001	mg/L	0.483	0.734	0.670	8.92	0.033	
Molybdenum	7439-98-7	0.001	mg/L	0.015	0.010	0.005	0.001	0.016	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	22.9	7.35	19.8	12.6	0.843	
Iron	7439-89-6	0.05	mg/L	78.4	132	0.72	3.72	0.29	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.6	0.2	0.2	0.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.11	1.99	<0.01	0.10	0.10	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	579	333	128	112	31.1	
∅ Total Cations	----	0.01	meq/L	640	357	115	99.8	27.3	
∅ Ionic Balance	----	0.01	%	5.00	3.58	4.98	5.69	6.48	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	80	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	80	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	150	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	150	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time					24-Jul-2019 07:00	23-Jul-2019 17:30	23-Jul-2019 11:55	23-Jul-2019 16:05	23-Jul-2019 17:00
Compound	CAS Number	LOR	Unit	EB1918178-009	EB1918178-010	EB1918178-013	EB1918178-014	EB1918178-015	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	124	114	121	111	119	
Toluene-D8	2037-26-5	2	%	94.5	96.5	96.5	98.6	94.0	
4-Bromofluorobenzene	460-00-4	2	%	97.5	96.1	98.5	96.8	96.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		IPCM GW Duplicate	----	----	----	----
Client sampling date / time		23-Jul-2019 00:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1918178-017	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.45	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	12300	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	8000	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	11	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	224	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	224	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	128	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	4250	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	310	----	----	----	----
Magnesium	7439-95-4	1	mg/L	113	----	----	----	----
Sodium	7440-23-5	1	mg/L	2040	----	----	----	----
Potassium	7440-09-7	1	mg/L	13	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.004	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.682	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.004	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L	0.025	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	20.0	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.11	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.47	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	----	----	----	----
Client sampling date / time				23-Jul-2019 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	EB1918178-017	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.004	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	0.681	----	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	0.005	----	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	
Strontium	7440-24-6	0.001	mg/L	19.5	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.68	----	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	127	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	114	----	----	----	----	
∅ Ionic Balance	----	0.01	%	5.48	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	----	----	----	----
Client sampling date / time				23-Jul-2019 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1918178-017	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	99.2	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	96.8	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order : EB1927085 Client : STANMORE IP COAL PTY LTD Contact : BELINDA PARFITT Address : GPO BOX 2602 BRISBANE QLD 4001 Telephone : 07 4816 7444 Project : IPCM Order number : P1002091 C-O-C number : ---- Sampler : SCOTT AULSEBROOK Site : ---- Quote number : TV/005/19 No. of samples received : 15 No. of samples analysed : 11	Page : 1 of 12 Laboratory : Environmental Division Brisbane Contact : Anna Riddell Address : 2 Byth Street Stafford QLD Australia 4053 Telephone : +61 7 4952 5795 Date Samples Received : 25-Oct-2019 09:30 Date Analysis Commenced : 25-Oct-2019 Issue Date : 01-Nov-2019 14:08
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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG020-F (Dissolved Metals by ICP-MS) & EG020-T (Total Metals by ICP-MS): Limit of reporting raised for sample EB1927085-007(MB4A) due to matrix interference.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- EK067G (Total Phosphorous as P): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time				22-Oct-2019 15:15	22-Oct-2019 16:35	23-Oct-2019 09:30	23-Oct-2019 13:00	22-Oct-2019 17:40	
Compound	CAS Number	LOR	Unit	EB1927085-001	EB1927085-002	EB1927085-003	EB1927085-005	EB1927085-006	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.46	7.43	7.38	7.59	7.57	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	8780	7430	23500	4040	7580	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	6380	4790	16600	2350	4500	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	<5	14	<5	<5	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	49	616	459	491	766	
Total Alkalinity as CaCO3	----	1	mg/L	49	616	459	491	766	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	113	100	559	46	154	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	3050	2280	8650	1080	2150	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	520	192	646	117	114	
Magnesium	7439-95-4	1	mg/L	117	274	566	122	162	
Sodium	7440-23-5	1	mg/L	1050	877	3870	520	1240	
Potassium	7440-09-7	1	mg/L	21	5	20	4	7	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	0.003	0.025	
Barium	7440-39-3	0.001	mg/L	0.208	0.137	0.292	0.222	0.141	
Molybdenum	7439-98-7	0.001	mg/L	0.001	<0.001	0.001	0.002	0.002	
Rubidium	7440-17-7	0.001	mg/L	0.030	0.009	0.033	0.004	0.012	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	8.29	5.33	45.7	2.64	4.02	
Iron	7439-89-6	0.05	mg/L	0.28	<0.05	0.71	0.16	1.59	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.16	0.09	0.01	0.06	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time					22-Oct-2019 15:15	22-Oct-2019 16:35	23-Oct-2019 09:30	23-Oct-2019 13:00	22-Oct-2019 17:40
Compound	CAS Number	LOR	Unit		EB1927085-001	EB1927085-002	EB1927085-003	EB1927085-005	EB1927085-006
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		<0.001	<0.001	0.002	0.004	0.025
Barium	7440-39-3	0.001	mg/L		0.222	0.155	3.49	0.259	0.149
Molybdenum	7439-98-7	0.001	mg/L		0.002	<0.001	0.022	0.004	0.003
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		9.13	5.93	51.3	2.98	4.35
Iron	7439-89-6	0.05	mg/L		0.40	0.58	1.27	0.21	1.85
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	0.1	0.4	0.5
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.02	0.01	<0.05	0.02	0.04
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		89.4	78.7	265	41.2	79.2
∅ Total Cations	----	0.01	meq/L		81.8	70.4	248	38.6	73.1
∅ Ionic Balance	----	0.01	%		4.43	5.56	3.35	3.30	3.95
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time					22-Oct-2019 15:15	22-Oct-2019 16:35	23-Oct-2019 09:30	23-Oct-2019 13:00	22-Oct-2019 17:40
Compound	CAS Number	LOR	Unit		EB1927085-001	EB1927085-002	EB1927085-003	EB1927085-005	EB1927085-006
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		98.4	101	97.3	74.7	92.5
Toluene-D8	2037-26-5	2	%		97.9	98.8	93.7	92.8	96.1
4-Bromofluorobenzene	460-00-4	2	%		106	108	103	98.2	100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB9A	MB9B	MB8B	IPCM GW Duplicate
Client sampling date / time				22-Oct-2019 13:20	22-Oct-2019 12:40	22-Oct-2019 11:30	23-Oct-2019 11:30	23-Oct-2019 09:35	
Compound	CAS Number	LOR	Unit	EB1927085-007	EB1927085-009	EB1927085-010	EB1927085-012	EB1927085-014	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.16	7.66	8.04	7.69	7.40	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	49300	10700	3780	11800	23600	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	39100	7160	2200	7890	16600	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	830	<5	45	9	10	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	383	99	375	169	454	
Total Alkalinity as CaCO3	----	1	mg/L	383	99	375	169	454	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	842	2	111	87	561	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	19900	3840	1010	4180	8610	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	578	287	63	280	650	
Magnesium	7439-95-4	1	mg/L	1760	137	110	116	568	
Sodium	7440-23-5	1	mg/L	8900	1620	540	2000	3880	
Potassium	7440-09-7	1	mg/L	5	19	9	13	20	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.001	0.001	0.004	0.001	
Barium	7440-39-3	0.001	mg/L	0.222	8.78	0.032	0.975	0.296	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	0.001	0.012	0.006	0.002	
Rubidium	7440-17-7	0.001	mg/L	0.016	0.028	0.015	0.024	0.035	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	22.3	11.8	1.23	16.4	44.2	
Iron	7439-89-6	0.05	mg/L	<0.05	0.70	<0.05	0.09	0.71	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	6.20	0.09	1.21	0.26	0.08	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB9A	MB9B	MB8B	IPCM GW Duplicate
Client sampling date / time				22-Oct-2019 13:20	22-Oct-2019 12:40	22-Oct-2019 11:30	23-Oct-2019 11:30	23-Oct-2019 09:35	
Compound	CAS Number	LOR	Unit	EB1927085-007	EB1927085-009	EB1927085-010	EB1927085-012	EB1927085-014	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.007	<0.001	0.001	0.004	0.002	
Barium	7440-39-3	0.001	mg/L	0.229	9.76	0.052	1.10	3.21	
Molybdenum	7439-98-7	0.001	mg/L	0.007	0.001	0.014	0.012	0.002	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	22.2	13.3	1.42	18.4	51.4	
Iron	7439-89-6	0.05	mg/L	11.8	0.98	1.96	0.36	1.21	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.2	0.2	0.2	0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	90.7	0.01	0.19	<0.05	<0.05	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	586	110	38.3	123	264	
∅ Total Cations	----	0.01	meq/L	561	96.5	35.9	111	248	
∅ Ionic Balance	----	0.01	%	2.23	6.67	3.20	5.24	2.96	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB9A	MB9B	MB8B	IPCM GW Duplicate
Client sampling date / time				22-Oct-2019 13:20	22-Oct-2019 12:40	22-Oct-2019 11:30	23-Oct-2019 11:30	23-Oct-2019 09:35	
Compound	CAS Number	LOR	Unit	EB1927085-007	EB1927085-009	EB1927085-010	EB1927085-012	EB1927085-014	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	74.2	73.7	92.8	95.7	95.1	
Toluene-D8	2037-26-5	2	%	94.4	95.5	94.6	96.6	97.1	
4-Bromofluorobenzene	460-00-4	2	%	102	103	99.6	102	103	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		Field Blank	----	----	----	----
Client sampling date / time		23-Oct-2019 18:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1927085-015	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	5.98	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	<10	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	2	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	2	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	<0.001	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L	<0.001	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	0.001	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Field Blank	----	----	----	----
Client sampling date / time				23-Oct-2019 18:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	EB1927085-015	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	<0.001	----	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	
Strontium	7440-24-6	0.001	mg/L	<0.001	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	0.04	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Field Blank	----	----	----	----
Client sampling date / time				23-Oct-2019 18:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1927085-015	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	----
[^] Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
[^] Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	71.4	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	96.8	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	101	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order : EB2001883 Client : STANMORE IP COAL PTY LTD Contact : BELINDA PARFITT Address : GPO BOX 2602 BRISBANE QLD 4001 Telephone : 07 4816 7444 Project : IPCM Order number : P1002091 C-O-C number : ---- Sampler : LIAM HAMERSVELD Site : ---- Quote number : TV/005/19 v3 No. of samples received : 12 No. of samples analysed : 12	Page : 1 of 12 Laboratory : Environmental Division Brisbane Contact : Anna Riddell Address : 2 Byth Street Stafford QLD Australia 4053 Telephone : +61 7 4952 5795 Date Samples Received : 23-Jan-2020 11:50 Date Analysis Commenced : 24-Jan-2020 Issue Date : 03-Feb-2020 15:11
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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised for sample MB4A (EB2001883-004) due to matrix interference.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised for sample MB4A (EB2001883-004) due to matrix interference.
- EK067G (Total Phosphorous as P): Some samples were diluted due to matrix interference (Salinity). LOR adjusted accordingly.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				SB1	MB1	MB2	MB4A	MB9A
Client sampling date / time				21-Jan-2020 17:40	21-Jan-2020 09:50	21-Jan-2020 09:10	21-Jan-2020 16:30	21-Jan-2020 15:20
Compound	CAS Number	LOR	Unit	EB2001883-001	EB2001883-002	EB2001883-003	EB2001883-004	EB2001883-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.44	7.45	7.26	6.74	7.49
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	8860	3210	7400	52600	10600
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	6430	1890	4590	39300	7270
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	10	<5	<5	1210	5
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	57	478	741	361	104
Total Alkalinity as CaCO3	----	1	mg/L	57	478	741	361	104
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	128	35	162	983	4
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3110	817	1960	19700	3830
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	520	80	109	702	296
Magnesium	7439-95-4	1	mg/L	117	95	159	1910	145
Sodium	7440-23-5	1	mg/L	1060	416	1220	9940	1670
Potassium	7440-09-7	1	mg/L	21	4	7	4	20
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.05	<0.01
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.005	<0.001
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.003	0.023	<0.005	<0.001
Barium	7440-39-3	0.001	mg/L	0.703	0.212	0.158	0.223	8.80
Molybdenum	7439-98-7	0.001	mg/L	0.002	0.011	0.002	<0.005	0.003
Rubidium	7440-17-7	0.001	mg/L	0.030	0.004	0.012	0.007	0.029
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.05	<0.01
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.005	<0.001
Strontium	7440-24-6	0.001	mg/L	9.82	2.34	4.68	25.0	14.1
Iron	7439-89-6	0.05	mg/L	0.20	<0.05	1.16	<0.05	0.48
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.10	0.08	0.03	7.01	0.13



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	MB1	MB2	MB4A	MB9A
Client sampling date / time				21-Jan-2020 17:40	21-Jan-2020 09:50	21-Jan-2020 09:10	21-Jan-2020 16:30	21-Jan-2020 15:20	
Compound	CAS Number	LOR	Unit	EB2001883-001	EB2001883-002	EB2001883-003	EB2001883-004	EB2001883-005	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.005	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.001	0.003	0.024	0.006	<0.001	
Barium	7440-39-3	0.001	mg/L	0.701	0.205	0.158	0.241	8.07	
Molybdenum	7439-98-7	0.001	mg/L	0.002	0.012	0.003	<0.005	0.003	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.05	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.005	<0.001	
Strontium	7440-24-6	0.001	mg/L	8.96	2.11	4.30	24.8	12.4	
Iron	7439-89-6	0.05	mg/L	0.46	0.18	1.36	11.8	0.78	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.5	0.5	0.3	0.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.10	0.02	0.03	0.24	<0.05	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	91.5	33.3	73.5	583	110	
∅ Total Cations	----	0.01	meq/L	82.2	30.0	71.8	625	99.8	
∅ Ionic Balance	----	0.01	%	5.36	5.24	1.17	3.42	4.92	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	MB1	MB2	MB4A	MB9A
Client sampling date / time					21-Jan-2020 17:40	21-Jan-2020 09:50	21-Jan-2020 09:10	21-Jan-2020 16:30	21-Jan-2020 15:20
Compound	CAS Number	LOR	Unit		EB2001883-001	EB2001883-002	EB2001883-003	EB2001883-004	EB2001883-005
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
[^] Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
[^] Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		102	98.3	104	123	120
Toluene-D8	2037-26-5	2	%		97.0	97.8	96.2	96.2	95.6
4-Bromofluorobenzene	460-00-4	2	%		101	100	99.6	103	101



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB9B	IPCM GW Field Blank	IPCM Trip Blank	MB8B	MB7
Client sampling date / time				21-Jan-2020 14:50	21-Jan-2020 17:50	20-Jan-2020 08:00	22-Jan-2020 18:20	23-Jan-2020 09:40	
Compound	CAS Number	LOR	Unit	EB2001883-006	EB2001883-007	EB2001883-008	EB2001883-009	EB2001883-010	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	8.15	6.72	----	7.47	7.23	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	3550	<1	----	11500	20500	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	2120	<10	----	8200	12200	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	10	<5	----	20	<5	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	411	5	----	103	309	
Total Alkalinity as CaCO3	----	1	mg/L	411	5	----	103	309	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	115	<1	----	12	323	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	923	<1	----	4150	7230	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	57	<1	----	281	433	
Magnesium	7439-95-4	1	mg/L	107	<1	----	139	376	
Sodium	7440-23-5	1	mg/L	496	<1	----	1840	3430	
Potassium	7440-09-7	1	mg/L	8	<1	----	15	18	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	----	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	----	0.003	<0.001	
Barium	7440-39-3	0.001	mg/L	0.040	<0.001	----	2.36	0.646	
Molybdenum	7439-98-7	0.001	mg/L	0.014	<0.001	----	0.005	<0.001	
Rubidium	7440-17-7	0.001	mg/L	0.013	<0.001	----	0.023	0.032	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	1.28	<0.001	----	14.0	41.3	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	----	<0.05	0.62	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.29	<0.01	----	0.30	0.02	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB9B	IPCM GW Field Blank	IPCM Trip Blank	MB8B	MB7
Client sampling date / time				21-Jan-2020 14:50	21-Jan-2020 17:50	20-Jan-2020 08:00	22-Jan-2020 18:20	23-Jan-2020 09:40	
Compound	CAS Number	LOR	Unit	EB2001883-006	EB2001883-007	EB2001883-008	EB2001883-009	EB2001883-010	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	----	0.004	<0.001	
Barium	7440-39-3	0.001	mg/L	0.041	<0.001	----	2.36	1.50	
Molybdenum	7439-98-7	0.001	mg/L	0.016	<0.001	----	0.006	0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	1.19	<0.001	----	11.8	35.6	
Iron	7439-89-6	0.05	mg/L	0.52	<0.05	----	0.35	0.59	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.2	<0.1	----	0.3	0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.11	<0.01	----	<0.05	<0.05	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	36.6	0.10	----	119	217	
∅ Total Cations	----	0.01	meq/L	33.4	<0.01	----	106	202	
∅ Ionic Balance	----	0.01	%	4.58	----	----	5.99	3.49	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB9B	IPCM GW Field Blank	IPCM Trip Blank	MB8B	MB7
Client sampling date / time					21-Jan-2020 14:50	21-Jan-2020 17:50	20-Jan-2020 08:00	22-Jan-2020 18:20	23-Jan-2020 09:40
Compound	CAS Number	LOR	Unit	EB2001883-006	EB2001883-007	EB2001883-008	EB2001883-009	EB2001883-010	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	110	102	124	130	129	
Toluene-D8	2037-26-5	2	%	99.1	99.7	95.0	93.5	96.6	
4-Bromofluorobenzene	460-00-4	2	%	105	104	105	100	102	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		IPCM GW Duplicate	Trip Blank	----	----	----
Client sampling date / time		23-Jan-2020 09:50		20-Jan-2020 08:00		----	----	----
Compound	CAS Number	LOR	Unit	EB2001883-011	EB2001883-012	-----	-----	-----
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.21	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	20500	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	15000	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	303	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	303	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	317	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	7310	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	421	----	----	----	----
Magnesium	7439-95-4	1	mg/L	366	----	----	----	----
Sodium	7440-23-5	1	mg/L	3260	----	----	----	----
Potassium	7440-09-7	1	mg/L	18	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.651	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L	0.032	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	40.9	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.57	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.05	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	Trip Blank	----	----	----
Client sampling date / time				23-Jan-2020 09:50	20-Jan-2020 08:00	----	----	----	
Compound	CAS Number	LOR	Unit	EB2001883-011	EB2001883-012	-----	-----	-----	
				Result	Result	----	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.001	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	1.26	----	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	0.002	----	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	
Strontium	7440-24-6	0.001	mg/L	36.8	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.56	----	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.1	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.05	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	219	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	193	----	----	----	----	
∅ Ionic Balance	----	0.01	%	6.18	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	Trip Blank	----	----	----	
Client sampling date / time				23-Jan-2020 09:50	20-Jan-2020 08:00	----	----	----		
Compound	CAS Number	LOR	Unit	EB2001883-011	EB2001883-012	-----	-----	-----		
				Result	Result	----	----	----		
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	----	----	----
EP080: BTEXN										
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----		
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----		
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----		
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----		
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----		
^ Total Xylenes				----	2	µg/L	<2	<2	----	----
^ Sum of BTEX				----	1	µg/L	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----		
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4	17060-07-0	2	%	129	125	----	----	----		
Toluene-D8	2037-26-5	2	%	94.4	97.4	----	----	----		
4-Bromofluorobenzene	460-00-4	2	%	99.7	101	----	----	----		



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order : **EB2010752**
Client : **STANMORE IP COAL PTY LTD**
Contact : BELINDA PARFITT
Address : GPO BOX 2602
 BRISBANE QLD 4001
Telephone : 07 4816 7444
Project : IPCM
Order number : P1002091
C-O-C number : ----
Sampler : LIAM HAMERSVELD
Site : ----
Quote number : TV/005/19 v3
No. of samples received : 13
No. of samples analysed : 13

Page : 1 of 12
Laboratory : Environmental Division Brisbane
Contact : Anna Riddell
Address : 2 Byth Street Stafford QLD Australia 4053

Telephone : +61 7 4952 5795
Date Samples Received : 01-May-2020 08:00
Date Analysis Commenced : 01-May-2020
Issue Date : 08-May-2020 18:36



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox		Brisbane Organics, Stafford, QLD
Sarah Ashworth	Laboratory Manager - Brisbane	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EK067G (Total Phosphorus as P): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EG035T (Total Mercury): Positive mercury results have been confirmed by re-extraction and re-analysis.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised for some samples due to matrix interference.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised for some samples due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				SB1	BC2	MB1	MB2	MB4A
Client sampling date / time				28-Apr-2020 15:00	28-Apr-2020 14:40	28-Apr-2020 16:20	28-Apr-2020 17:30	28-Apr-2020 13:30
Compound	CAS Number	LOR	Unit	EB2010752-001	EB2010752-002	EB2010752-003	EB2010752-004	EB2010752-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.70	8.18	8.30	8.30	7.85
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	9150	7520	3760	7370	49700
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	6460	4770	2080	4330	41000
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	7	<5	30	6	1690
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	4	10	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	67	645	489	743	384
Total Alkalinity as CaCO3	----	1	mg/L	67	645	493	753	384
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	121	105	37	148	926
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3140	2310	965	1930	19800
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	515	193	106	103	646
Magnesium	7439-95-4	1	mg/L	122	287	119	153	1980
Sodium	7440-23-5	1	mg/L	1070	932	488	1240	9780
Potassium	7440-09-7	1	mg/L	21	5	4	7	3
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	0.027	<0.005
Barium	7440-39-3	0.001	mg/L	0.257	0.242	0.211	0.133	0.212
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	<0.001	0.002	<0.005
Rubidium	7440-17-7	0.001	mg/L	0.032	0.010	0.003	0.012	0.005
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005
Strontium	7440-24-6	0.001	mg/L	7.56	5.01	2.24	3.39	24.0
Iron	7439-89-6	0.05	mg/L	0.54	<0.05	0.07	1.27	0.06
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.15	0.07	0.73	0.12	35.7



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					28-Apr-2020 15:00	28-Apr-2020 14:40	28-Apr-2020 16:20	28-Apr-2020 17:30	28-Apr-2020 13:30
Compound	CAS Number	LOR	Unit		EB2010752-001	EB2010752-002	EB2010752-003	EB2010752-004	EB2010752-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.005
Arsenic	7440-38-2	0.001	mg/L		0.002	0.002	0.004	0.026	0.031
Barium	7440-39-3	0.001	mg/L		0.263	0.237	0.230	0.133	0.394
Molybdenum	7439-98-7	0.001	mg/L		0.001	<0.001	0.001	0.003	0.020
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.05
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.005
Strontium	7440-24-6	0.001	mg/L		7.96	5.29	2.41	3.48	25.7
Iron	7439-89-6	0.05	mg/L		1.14	0.22	1.54	1.44	60.6
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	0.0002
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	0.5	0.6	0.3
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.03	<0.01	0.06	0.02	0.86
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		92.4	80.2	37.8	72.6	585
∅ Total Cations	----	0.01	meq/L		82.8	73.9	36.4	71.8	621
∅ Ionic Balance	----	0.01	%		5.49	4.10	1.92	0.50	2.92
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					28-Apr-2020 15:00	28-Apr-2020 14:40	28-Apr-2020 16:20	28-Apr-2020 17:30	28-Apr-2020 13:30
Compound	CAS Number	LOR	Unit	EB2010752-001	EB2010752-002	EB2010752-003	EB2010752-004	EB2010752-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	82.8	94.3	99.4	100	106	
Toluene-D8	2037-26-5	2	%	96.5	94.0	96.8	96.1	92.3	
4-Bromofluorobenzene	460-00-4	2	%	93.0	98.7	102	100	99.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4B	MB7	MB8B	MB9A	MB9B
Client sampling date / time				29-Apr-2020 09:50	29-Apr-2020 09:10	29-Apr-2020 12:40	28-Apr-2020 13:00	28-Apr-2020 11:45	
Compound	CAS Number	LOR	Unit	EB2010752-006	EB2010752-007	EB2010752-008	EB2010752-009	EB2010752-010	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	8.31	7.93	7.96	7.99	8.53	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	31000	20100	11500	10900	3480	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	20500	15200	7960	7740	1950	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	10500	13	72	76	<5	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	18	<1	<1	<1	43	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1090	263	98	100	384	
Total Alkalinity as CaCO3	----	1	mg/L	1110	263	98	100	427	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	378	233	3	2	106	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	10800	7150	4170	3880	862	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	81	415	306	266	62	
Magnesium	7439-95-4	1	mg/L	472	333	133	141	110	
Sodium	7440-23-5	1	mg/L	6830	3300	1860	1710	509	
Potassium	7440-09-7	1	mg/L	3	18	14	19	7	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.005	0.001	0.004	<0.001	0.001	
Barium	7440-39-3	0.001	mg/L	0.174	0.645	4.05	7.67	0.088	
Molybdenum	7439-98-7	0.001	mg/L	0.005	0.003	0.002	0.002	0.015	
Rubidium	7440-17-7	0.001	mg/L	<0.005	0.031	0.020	0.028	0.011	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	7.90	36.9	12.9	10.9	0.944	
Iron	7439-89-6	0.05	mg/L	0.07	0.80	0.15	0.34	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	30.6	0.04	1.17	1.64	0.12	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4B	MB7	MB8B	MB9A	MB9B
Client sampling date / time				29-Apr-2020 09:50	29-Apr-2020 09:10	29-Apr-2020 12:40	28-Apr-2020 13:00	28-Apr-2020 11:45	
Compound	CAS Number	LOR	Unit	EB2010752-006	EB2010752-007	EB2010752-008	EB2010752-009	EB2010752-010	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.017	0.001	0.004	0.002	0.001	
Barium	7440-39-3	0.001	mg/L	0.409	1.45	4.12	7.75	0.094	
Molybdenum	7439-98-7	0.001	mg/L	0.011	0.006	0.002	0.003	0.020	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	8.19	40.8	14.2	12.3	1.12	
Iron	7439-89-6	0.05	mg/L	63.6	0.91	1.37	2.63	0.29	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.8	<0.1	0.2	0.2	0.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.94	<0.05	<0.05	0.12	0.12	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	335	212	120	111	35.0	
∅ Total Cations	----	0.01	meq/L	340	192	107	99.7	34.5	
∅ Ionic Balance	----	0.01	%	0.79	4.87	5.36	5.56	0.84	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4B	MB7	MB8B	MB9A	MB9B	
Client sampling date / time				29-Apr-2020 09:50	29-Apr-2020 09:10	29-Apr-2020 12:40	28-Apr-2020 13:00	28-Apr-2020 11:45		
Compound	CAS Number	LOR	Unit	EB2010752-006	EB2010752-007	EB2010752-008	EB2010752-009	EB2010752-010		
				Result	Result	Result	Result	Result		
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1		
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2		
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2		
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2		
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2		
^ Total Xylenes				----	2	µg/L	<2	<2	<2	
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5		
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4	17060-07-0	2	%	103	101	99.9	104	102		
Toluene-D8	2037-26-5	2	%	93.0	96.0	97.2	98.1	95.6		
4-Bromofluorobenzene	460-00-4	2	%	99.7	102	102	105	101		



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----	----
Client sampling date / time				29-Apr-2020 14:30	29-Apr-2020 09:15	24-Apr-2020 15:00	----	----	
Compound	CAS Number	LOR	Unit	EB2010752-012	EB2010752-013	EB2010752-014	-----	-----	
				Result	Result	Result	----	----	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.97	6.38	----	----	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	19900	1	----	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	14300	<10	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	<5	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	270	5	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	270	5	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	231	<1	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	7100	<1	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	420	<1	----	----	----	
Magnesium	7439-95-4	1	mg/L	331	<1	----	----	----	
Sodium	7440-23-5	1	mg/L	3340	<1	----	----	----	
Potassium	7440-09-7	1	mg/L	17	<1	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	----	----	----	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	----	----	----	
Barium	7440-39-3	0.001	mg/L	0.687	<0.001	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	0.004	<0.001	----	----	----	
Rubidium	7440-17-7	0.001	mg/L	0.031	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	----	----	
Strontium	7440-24-6	0.001	mg/L	37.8	<0.001	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.82	<0.05	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	<0.01	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----	----
Client sampling date / time				29-Apr-2020 14:30	29-Apr-2020 09:15	24-Apr-2020 15:00	----	----	
Compound	CAS Number	LOR	Unit	EB2010752-012	EB2010752-013	EB2010752-014	-----	-----	
				Result	Result	Result	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	
Barium	7440-39-3	0.001	mg/L	1.31	<0.001	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	0.005	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	----	----	----	
Strontium	7440-24-6	0.001	mg/L	43.5	<0.001	----	----	----	
Iron	7439-89-6	0.05	mg/L	1.01	<0.05	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.05	<0.01	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	210	0.10	----	----	----	
∅ Total Cations	----	0.01	meq/L	194	<0.01	----	----	----	
∅ Ionic Balance	----	0.01	%	4.10	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----	----	
Client sampling date / time				29-Apr-2020 14:30	29-Apr-2020 09:15	24-Apr-2020 15:00	----	----		
Compound	CAS Number	LOR	Unit	EB2010752-012	EB2010752-013	EB2010752-014	-----	-----		
				Result	Result	Result	----	----		
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	----	----
EP080: BTEXN										
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----		
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----		
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----		
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----		
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----		
^ Total Xylenes				----	2	µg/L	<2	<2	----	----
^ Sum of BTEX				----	1	µg/L	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----		
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4	17060-07-0	2	%	102	101	100	----	----		
Toluene-D8	2037-26-5	2	%	96.7	98.6	97.5	----	----		
4-Bromofluorobenzene	460-00-4	2	%	103	102	102	----	----		



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order : EB2019500 Client : STANMORE IP COAL PTY LTD Contact : BELINDA PARFITT Address : GPO BOX 2602 BRISBANE QLD 4001 Telephone : 07 4816 7444 Project : IPCM Order number : P1002091 C-O-C number : ---- Sampler : LIAM HAMERSVELD Site : ---- Quote number : TV/005/19 v3 No. of samples received : 11 No. of samples analysed : 11	Page : 1 of 12 Laboratory : Environmental Division Brisbane Contact : Anna Riddell Address : 2 Byth Street Stafford QLD Australia 4053 Telephone : +61 7 4952 5795 Date Samples Received : 24-Jul-2020 08:40 Date Analysis Commenced : 24-Jul-2020 Issue Date : 31-Jul-2020 12:20
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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Minh Wills	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Morgan Lennox		Brisbane Organics, Stafford, QLD
Santusha Pandra	Senior Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EK067G (Total Phosphorus as P): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- EP080: Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- Samples containing fine particulate matter less than 1.2 µm may bias low for TSS via EA025H.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised for sample MB4A (EB2019500-005) due to matrix interference.
- It is recognised that EG020T (Total Metals) is less than EG020F (Dissolved Metals) for sample MB4A (EB2019500-005). However, the difference is within experimental variation of the methods.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised for sample MB4A (EB2019500-005) due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time				22-Jul-2020 12:40	22-Jul-2020 13:50	22-Jul-2020 16:50	22-Jul-2020 14:50	22-Jul-2020 11:11	
Compound	CAS Number	LOR	Unit	EB2019500-001	EB2019500-002	EB2019500-003	EB2019500-004	EB2019500-005	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.50	7.45	7.58	7.50	7.15	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	9010	7660	3380	7320	52700	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	5890	4750	1860	4100	39200	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	16	793	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	52	648	518	766	392	
Total Alkalinity as CaCO3	----	1	mg/L	52	648	518	766	392	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	130	110	36	146	960	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	3030	2290	817	1910	19900	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	600	245	94	134	629	
Magnesium	7439-95-4	1	mg/L	126	299	102	159	1940	
Sodium	7440-23-5	1	mg/L	1170	1010	514	1340	9610	
Potassium	7440-09-7	1	mg/L	23	6	4	8	3	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.007	0.032	<0.005	
Barium	7440-39-3	0.001	mg/L	0.274	0.149	0.147	0.134	0.192	
Molybdenum	7439-98-7	0.001	mg/L	0.001	<0.001	0.005	0.003	0.008	
Rubidium	7440-17-7	0.001	mg/L	0.032	0.011	0.004	0.012	0.008	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	
Strontium	7440-24-6	0.001	mg/L	8.46	5.85	2.12	4.00	25.8	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.55	1.52	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.04	0.22	4.47	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					22-Jul-2020 12:40	22-Jul-2020 13:50	22-Jul-2020 16:50	22-Jul-2020 14:50	22-Jul-2020 11:11
Compound	CAS Number	LOR	Unit	EB2019500-001	EB2019500-002	EB2019500-003	EB2019500-004	EB2019500-005	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.007	0.034	0.005	
Barium	7440-39-3	0.001	mg/L	0.298	0.168	0.153	0.148	0.211	
Molybdenum	7439-98-7	0.001	mg/L	0.002	<0.001	0.007	0.003	<0.005	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	
Strontium	7440-24-6	0.001	mg/L	8.88	6.07	2.20	4.16	27.8	
Iron	7439-89-6	0.05	mg/L	0.12	0.17	0.68	1.73	8.48	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.2	0.5	0.5	0.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.02	0.04	0.04	0.13	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	89.2	79.8	34.1	72.2	589	
∅ Total Cations	----	0.01	meq/L	91.8	80.9	35.5	78.3	609	
∅ Ionic Balance	----	0.01	%	1.42	0.67	2.01	4.01	1.67	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					22-Jul-2020 12:40	22-Jul-2020 13:50	22-Jul-2020 16:50	22-Jul-2020 14:50	22-Jul-2020 11:11
Compound	CAS Number	LOR	Unit	EB2019500-001	EB2019500-002	EB2019500-003	EB2019500-004	EB2019500-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	98.8	99.9	99.1	106	
Toluene-D8	2037-26-5	2	%	97.3	97.2	98.1	101	97.6	
4-Bromofluorobenzene	460-00-4	2	%	101	99.2	101	103	102	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	IPCM GW Duplicate
Client sampling date / time				22-Jul-2020 10:10	22-Jul-2020 07:50	22-Jul-2020 10:40	22-Jul-2020 09:40	22-Jul-2020 10:15	
Compound	CAS Number	LOR	Unit	EB2019500-006	EB2019500-007	EB2019500-008	EB2019500-009	EB2019500-010	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.39	7.50	7.70	8.12	7.43	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	24000	11500	10900	4300	23900	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	16100	7160	6820	2520	16000	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	28	63	<5	<5	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	451	97	104	339	456	
Total Alkalinity as CaCO3	----	1	mg/L	451	97	104	339	456	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	547	2	3	124	547	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	8260	4010	3760	1140	8230	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	773	402	345	80	758	
Magnesium	7439-95-4	1	mg/L	540	129	136	127	527	
Sodium	7440-23-5	1	mg/L	4260	1960	1820	665	4070	
Potassium	7440-09-7	1	mg/L	22	16	20	9	22	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.008	<0.001	0.001	0.002	
Barium	7440-39-3	0.001	mg/L	0.433	6.71	8.64	0.137	0.429	
Molybdenum	7439-98-7	0.001	mg/L	0.001	0.001	0.001	0.012	0.001	
Rubidium	7440-17-7	0.001	mg/L	0.040	0.023	0.032	0.016	0.039	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	50.2	15.8	13.0	1.43	49.1	
Iron	7439-89-6	0.05	mg/L	0.57	<0.05	0.09	<0.05	0.54	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.48	1.25	0.13	0.04	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	IPCM GW Duplicate
Client sampling date / time					22-Jul-2020 10:10	22-Jul-2020 07:50	22-Jul-2020 10:40	22-Jul-2020 09:40	22-Jul-2020 10:15
Compound	CAS Number	LOR	Unit		EB2019500-006	EB2019500-007	EB2019500-008	EB2019500-009	EB2019500-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		0.002	0.010	0.002	0.001	0.002
Barium	7440-39-3	0.001	mg/L		1.15	7.56	9.63	0.156	0.945
Molybdenum	7439-98-7	0.001	mg/L		0.002	0.001	0.001	0.015	0.002
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		52.4	16.8	14.1	1.49	52.2
Iron	7439-89-6	0.05	mg/L		0.70	0.59	1.91	0.18	0.69
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		0.1	0.2	0.2	0.2	0.1
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		<0.05	<0.05	0.04	0.07	<0.05
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		253	115	108	41.5	253
∅ Total Cations	----	0.01	meq/L		269	116	108	43.6	259
∅ Ionic Balance	----	0.01	%		2.96	0.54	0.06	2.45	1.20
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	IPCM GW Duplicate	
Client sampling date / time					22-Jul-2020 10:10	22-Jul-2020 07:50	22-Jul-2020 10:40	22-Jul-2020 09:40	22-Jul-2020 10:15	
Compound	CAS Number	LOR	Unit	EB2019500-006	EB2019500-007	EB2019500-008	EB2019500-009	EB2019500-010	EB2019500-010	
				Result	Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2	
^ Total Xylenes				----	2	µg/L	<2	<2	<2	
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4	17060-07-0	2	%	97.8	98.4	97.6	97.1	98.3	98.3	
Toluene-D8	2037-26-5	2	%	97.0	99.7	98.4	98.5	99.4	99.4	
4-Bromofluorobenzene	460-00-4	2	%	100	102	101	101	103	103	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			IPCM GW Field Blank	----	----	----	----
Client sampling date / time		22-Jul-2020 09:30			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB2019500-011	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	5.72	----	----	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	----	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	<10	----	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	----	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	4	----	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	<0.001	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L	<0.001	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	<0.001	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Field Blank	----	----	----	----
Client sampling date / time				22-Jul-2020 09:30	----	----	----	----	
Compound	CAS Number	LOR	Unit	EB2019500-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	<0.001	----	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<0.001	----	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	
Strontium	7440-24-6	0.001	mg/L	<0.001	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	0.08	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Field Blank	----	----	----	----		
Client sampling date / time				22-Jul-2020 09:30	----	----	----	----			
Compound	CAS Number	LOR	Unit	EB2019500-011	-----	-----	-----	-----			
				Result	----	----	----	----			
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued											
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	----	----	----	----
EP080: BTEXN											
Benzene	71-43-2	1	µg/L	<1	----	----	----	----			
Toluene	108-88-3	2	µg/L	<2	----	----	----	----			
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----			
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----			
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----			
^ Total Xylenes				----	2	µg/L	<2	----	----	----	
^ Sum of BTEX				----	1	µg/L	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----			
EP080S: TPH(V)/BTEX Surrogates											
1,2-Dichloroethane-D4	17060-07-0	2	%	102	----	----	----	----			
Toluene-D8	2037-26-5	2	%	98.4	----	----	----	----			
4-Bromofluorobenzene	460-00-4	2	%	101	----	----	----	----			



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order	: EB2020138	Page	: 1 of 6
Client	: STANMORE IP COAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: BELINDA PARFITT	Contact	: Anna Riddell
Address	: GPO BOX 2602 BRISBANE QLD 4001	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 4816 7444	Telephone	: +61 7 4952 5795
Project	: IPCM	Date Samples Received	: 31-Jul-2020 08:20
Order number	: P1002091	Date Analysis Commenced	: 03-Aug-2020
C-O-C number	: ----	Issue Date	: 07-Aug-2020 10:39
Sampler	: SCOTT AULSEBROOK		
Site	: ----		
Quote number	: TV/005/19 v3		
No. of samples received	: 3		
No. of samples analysed	: 3		



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ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Dave Gitsham	Metals Instrument Chemist	Brisbane Inorganics, Stafford, QLD
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Matt Frost	Assistant Laboratory Manager	Brisbane Organics, Stafford, QLD



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG020T (Total Metals by ICP-MS): Limit of reporting raised for sample MB4B (EB2020138-001) due to matrix interference.
- EK067G (Total Phosphorus as P): Sample EB2020138_002 (MB12) was diluted due to matrix interference. LOR adjusted accordingly.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP071TRH : Sample "EB2020708_01" shows poor duplicate results confirmed by re-extraction and re-analysis.
- EG035T (Total Mercury): Positive mercury results have been confirmed by re-extraction and re-analysis.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for sample MB4B (EB2020138-001). However, the difference is within experimental variation of the methods.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised for sample MB4B (EB2020138-001) due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		MB4B	MB12	MB14	----	----
Client sampling date / time				30-Jul-2020 11:30	30-Jul-2020 09:45	30-Jul-2020 06:50	----	----		
Compound	CAS Number	LOR	Unit	EB2020138-001	EB2020138-002	EB2020138-003	-----	-----		
				Result	Result	Result	----	----		
EA005P: pH by PC Titrator										
pH Value	----	0.01	pH Unit	7.70	7.43	7.81	----	----		
EA010P: Conductivity by PC Titrator										
Electrical Conductivity @ 25°C	----	1	µS/cm	30700	12300	2980	----	----		
EA015: Total Dissolved Solids dried at 180 ± 5 °C										
Total Dissolved Solids @180°C	----	10	mg/L	19700	7900	1740	----	----		
EA025: Total Suspended Solids dried at 104 ± 2°C										
Suspended Solids (SS)	----	5	mg/L	35400	20	64	----	----		
ED037P: Alkalinity by PC Titrator										
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	1140	260	452	----	----		
Total Alkalinity as CaCO3	----	1	mg/L	1140	260	452	----	----		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA										
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	406	205	119	----	----		
ED045G: Chloride by Discrete Analyser										
Chloride	16887-00-6	1	mg/L	10800	4360	731	----	----		
ED093F: Dissolved Major Cations										
Calcium	7440-70-2	1	mg/L	87	280	58	----	----		
Magnesium	7439-95-4	1	mg/L	505	277	130	----	----		
Sodium	7440-23-5	1	mg/L	7150	2170	428	----	----		
Potassium	7440-09-7	1	mg/L	3	23	12	----	----		
EG020F: Dissolved Metals by ICP-MS										
Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.01	<0.01	----	----		
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	----	----		
Arsenic	7440-38-2	0.001	mg/L	<0.005	0.002	0.003	----	----		
Barium	7440-39-3	0.001	mg/L	0.193	0.481	0.052	----	----		
Molybdenum	7439-98-7	0.001	mg/L	0.007	0.011	0.002	----	----		
Rubidium	7440-17-7	0.001	mg/L	<0.005	0.042	0.017	----	----		
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	----	----		
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	----	----		
Strontium	7440-24-6	0.001	mg/L	8.64	16.3	1.29	----	----		
Iron	7439-89-6	0.05	mg/L	<0.05	0.32	0.08	----	----		
EG020T: Total Metals by ICP-MS										
Aluminium	7429-90-5	0.01	mg/L	170	0.08	2.73	----	----		



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4B	MB12	MB14	----	----
Client sampling date / time				30-Jul-2020 11:30	30-Jul-2020 09:45	30-Jul-2020 06:50	----	----	
Compound	CAS Number	LOR	Unit	EB2020138-001	EB2020138-002	EB2020138-003	-----	-----	
				Result	Result	Result	----	----	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.047	0.003	0.003	----	----	
Barium	7440-39-3	0.001	mg/L	2.55	1.32	0.062	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	0.014	0.002	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.01	<0.01	----	----	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.001	<0.001	----	----	
Strontium	7440-24-6	0.001	mg/L	12.4	16.4	1.30	----	----	
Iron	7439-89-6	0.05	mg/L	270	0.77	4.45	----	----	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	0.0004	<0.0001	<0.0001	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.6	0.2	<0.1	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	11.0	<0.05	0.16	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	336	132	32.1	----	----	
∅ Total Cations	----	0.01	meq/L	357	132	32.5	----	----	
∅ Ionic Balance	----	0.01	%	3.04	0.27	0.60	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	100	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	100	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	170	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	170	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4B	MB12	MB14	----	----
Client sampling date / time				30-Jul-2020 11:30	30-Jul-2020 09:45	30-Jul-2020 06:50	----	----	
Compound	CAS Number	LOR	Unit	EB2020138-001	EB2020138-002	EB2020138-003	-----	-----	
				Result	Result	Result	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	95.4	91.7	96.4	----	----	
Toluene-D8	2037-26-5	2	%	114	96.4	104	----	----	
4-Bromofluorobenzene	460-00-4	2	%	105	103	108	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CERTIFICATE OF ANALYSIS

Work Order	: EB2023609	Page	: 1 of 12
Client	: STANMORE IP COAL PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: BELINDA PARFITT	Contact	: Anna Riddell
Address	: GPO BOX 2602 BRISBANE QLD 4001	Address	: 2 Byth Street Stafford QLD Australia 4053
Telephone	: 07 4816 7444	Telephone	: +61 7 4952 5795
Project	: IPCM	Date Samples Received	: 29-Oct-2020 12:00
Order number	: P1002091	Date Analysis Commenced	: 30-Oct-2020
C-O-C number	: ----	Issue Date	: 09-Nov-2020 09:13
Sampler	: LIAM HAMERSVELD		
Site	: ----		
Quote number	: TV/005/19 v4		
No. of samples received	: 16		
No. of samples analysed	: 14		



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

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- Analytical Results
- Surrogate Control Limits

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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Diana Mesa	Senior Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Morgan Lennox	2IC Organic Chemist	Brisbane Organics, Stafford, QLD



General Comments

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
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^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG020F (Dissolved Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- EG020T (Total Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- EK067G (Total Phosphorus as P): Some samples were diluted due to matrix interference. LOR adjusted accordingly.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- It is recognised that EG020T (Total Metals) is less than EG020F (Dissolved Metals) for some samples. However, the difference is within experimental variation of the methods.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				SB1	BC2	MB1	MB2	MB4A
Client sampling date / time				26-Oct-2020 12:00	26-Oct-2020 13:10	26-Oct-2020 15:40	26-Oct-2020 14:30	27-Oct-2020 12:50
Compound	CAS Number	LOR	Unit	EB2023609-001	EB2023609-002	EB2023609-003	EB2023609-004	EB2023609-005
				Result	Result	Result	Result	Result
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.30	7.20	7.38	7.39	6.85
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	8850	7620	3350	7250	52800
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	5610	5020	1970	4350	47900
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	12	11	15	3800
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	49	609	523	746	383
Total Alkalinity as CaCO3	----	1	mg/L	49	609	523	746	383
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	119	101	35	153	969
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3100	2540	836	1900	19200
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	536	233	82	112	730
Magnesium	7439-95-4	1	mg/L	132	311	106	165	2130
Sodium	7440-23-5	1	mg/L	1110	990	484	1270	10700
Potassium	7440-09-7	1	mg/L	22	6	3	7	4
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.30
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	0.008	0.028	<0.005
Barium	7440-39-3	0.001	mg/L	0.211	0.152	0.211	0.153	0.233
Molybdenum	7439-98-7	0.001	mg/L	0.002	<0.001	<0.001	0.003	<0.005
Rubidium	7440-17-7	0.001	mg/L	0.036	0.012	0.004	0.013	0.008
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005
Strontium	7440-24-6	0.001	mg/L	8.69	6.17	2.10	3.63	25.4
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.07	0.21	0.06
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.04	0.01	0.03	0.07	8.84



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					26-Oct-2020 12:00	26-Oct-2020 13:10	26-Oct-2020 15:40	26-Oct-2020 14:30	27-Oct-2020 12:50
Compound	CAS Number	LOR	Unit		EB2023609-001	EB2023609-002	EB2023609-003	EB2023609-004	EB2023609-005
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.005
Arsenic	7440-38-2	0.001	mg/L		0.002	<0.001	0.007	0.031	0.009
Barium	7440-39-3	0.001	mg/L		0.206	0.157	0.217	0.162	0.274
Molybdenum	7439-98-7	0.001	mg/L		0.001	<0.001	<0.001	0.002	<0.005
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.05
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.005
Strontium	7440-24-6	0.001	mg/L		8.59	6.14	2.04	3.70	24.7
Iron	7439-89-6	0.05	mg/L		0.11	0.08	0.11	0.49	14.6
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	0.5	0.5	0.3
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.07	0.02	<0.01	0.02	0.14
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		90.9	85.9	34.8	71.7	569
∅ Total Cations	----	0.01	meq/L		86.4	80.4	33.9	74.6	677
∅ Ionic Balance	----	0.01	%		2.51	3.30	1.19	1.98	8.65
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	380
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	380
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	310
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	310



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB1	MB2	MB4A
Client sampling date / time					26-Oct-2020 12:00	26-Oct-2020 13:10	26-Oct-2020 15:40	26-Oct-2020 14:30	27-Oct-2020 12:50
Compound	CAS Number	LOR	Unit	EB2023609-001	EB2023609-002	EB2023609-003	EB2023609-004	EB2023609-005	EB2023609-005
				Result	Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	310
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	116	118	125	118	124	124
Toluene-D8	2037-26-5	2	%	94.0	92.8	99.4	97.0	95.4	95.4
4-Bromofluorobenzene	460-00-4	2	%	108	106	114	107	110	110



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	MB12
Client sampling date / time				27-Oct-2020 11:30	26-Oct-2020 17:50	27-Oct-2020 15:50	27-Oct-2020 14:50	27-Oct-2020 08:40	
Compound	CAS Number	LOR	Unit	EB2023609-007	EB2023609-008	EB2023609-009	EB2023609-010	EB2023609-012	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.22	7.45	7.43	7.96	7.20	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	24500	11000	10700	3460	13300	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	18300	8290	8120	2030	10100	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	34	214	12	16	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	466	111	103	418	352	
Total Alkalinity as CaCO3	----	1	mg/L	466	111	103	418	352	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	605	6	3	113	321	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	8630	3910	3830	891	4580	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	630	318	296	58	323	
Magnesium	7439-95-4	1	mg/L	638	140	152	108	314	
Sodium	7440-23-5	1	mg/L	4430	1880	1860	557	2240	
Potassium	7440-09-7	1	mg/L	23	16	21	8	24	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.004	0.011	0.001	0.006	0.029	
Barium	7440-39-3	0.001	mg/L	0.315	7.63	8.55	0.132	0.764	
Molybdenum	7439-98-7	0.001	mg/L	0.004	0.001	0.001	0.015	0.005	
Rubidium	7440-17-7	0.001	mg/L	0.045	0.023	0.034	0.014	0.039	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	54.7	13.6	11.5	1.26	15.7	
Iron	7439-89-6	0.05	mg/L	1.02	0.10	0.56	<0.05	2.52	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	0.28	1.38	0.64	0.03	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	MB12
Client sampling date / time					27-Oct-2020 11:30	26-Oct-2020 17:50	27-Oct-2020 15:50	27-Oct-2020 14:50	27-Oct-2020 08:40
Compound	CAS Number	LOR	Unit	EB2023609-007	EB2023609-008	EB2023609-009	EB2023609-010	EB2023609-012	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.004	0.008	0.002	0.005	0.029	
Barium	7440-39-3	0.001	mg/L	0.793	7.63	9.21	1.31	0.870	
Molybdenum	7439-98-7	0.001	mg/L	0.004	<0.001	0.001	0.011	0.003	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	56.0	13.5	12.2	1.07	15.5	
Iron	7439-89-6	0.05	mg/L	1.11	0.44	2.88	1.31	2.50	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.1	0.2	0.2	0.3	0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.05	0.02	0.14	0.05	<0.05	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	265	113	110	35.8	143	
∅ Total Cations	----	0.01	meq/L	277	110	109	36.2	140	
∅ Ionic Balance	----	0.01	%	2.19	1.38	0.66	0.52	1.03	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB7	MB8B	MB9A	MB9B	MB12
Client sampling date / time					27-Oct-2020 11:30	26-Oct-2020 17:50	27-Oct-2020 15:50	27-Oct-2020 14:50	27-Oct-2020 08:40
Compound	CAS Number	LOR	Unit	EB2023609-007	EB2023609-008	EB2023609-009	EB2023609-010	EB2023609-012	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	116	120	120	120	117	
Toluene-D8	2037-26-5	2	%	91.8	93.4	96.2	93.2	93.8	
4-Bromofluorobenzene	460-00-4	2	%	105	110	108	104	106	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----
Client sampling date / time				26-Oct-2020 16:45	27-Oct-2020 00:00	28-Oct-2020 07:00	22-Oct-2020 15:00	----	----
Compound	CAS Number	LOR	Unit	EB2023609-013	EB2023609-014	EB2023609-015	EB2023609-016	-----	-----
				Result	Result	Result	Result	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.81	7.28	6.87	----	----	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	3060	24500	<1	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	1860	18600	<10	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	5	<5	----	----	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	456	472	3	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	456	472	3	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	114	608	<1	----	----	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	744	8630	<1	----	----	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	60	634	<1	----	----	----
Magnesium	7439-95-4	1	mg/L	135	649	<1	----	----	----
Sodium	7440-23-5	1	mg/L	425	4370	<1	----	----	----
Potassium	7440-09-7	1	mg/L	12	23	<1	----	----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	<0.001	----	----	----
Barium	7440-39-3	0.001	mg/L	0.063	0.322	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.001	0.004	<0.001	----	----	----
Rubidium	7440-17-7	0.001	mg/L	0.018	0.044	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----	----
Strontium	7440-24-6	0.001	mg/L	1.04	55.7	0.004	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	1.04	<0.05	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	<0.01	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----
Client sampling date / time				26-Oct-2020 16:45	27-Oct-2020 00:00	28-Oct-2020 07:00	22-Oct-2020 15:00	----	----
Compound	CAS Number	LOR	Unit	EB2023609-013	EB2023609-014	EB2023609-015	EB2023609-016	-----	-----
				Result	Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	0.002	0.003	<0.001	----	----	----
Barium	7440-39-3	0.001	mg/L	0.069	0.620	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.003	<0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	----	----	----
Strontium	7440-24-6	0.001	mg/L	1.10	49.0	<0.001	----	----	----
Iron	7439-89-6	0.05	mg/L	0.07	1.08	<0.05	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.05	<0.05	0.01	----	----	----
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	32.5	266	0.06	----	----	----
∅ Total Cations	----	0.01	meq/L	32.9	276	<0.01	----	----	----
∅ Ionic Balance	----	0.01	%	0.65	1.88	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB14	IPCM GW Duplicate	IPCM GW Field Blank	IPCM Trip Blank	----
Client sampling date / time					26-Oct-2020 16:45	27-Oct-2020 00:00	28-Oct-2020 07:00	22-Oct-2020 15:00	----
Compound	CAS Number	LOR	Unit	EB2023609-013	EB2023609-014	EB2023609-015	EB2023609-016	-----	-----
				Result	Result	Result	Result		----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----		----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1		----
Toluene	108-88-3	2	µg/L	<2	<2	4	<2		----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2		----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2		----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2		----
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2		----
[^] Sum of BTEX	----	1	µg/L	<1	<1	4	<1		----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5		----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	121	121	122	122		----
Toluene-D8	2037-26-5	2	%	94.5	93.5	94.2	94.6		----
4-Bromofluorobenzene	460-00-4	2	%	108	108	110	104		----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

CLIENT: STANMORE IP COAL PTY LTD
PROJECT: ISAAC PLAINS COMPLEX
REPORT: 2020 ANNUAL GROUNDWATER REVIEW
DATE: MAY 2021



Appendix 2 – IPC Exceedance Investigation



C&R CONSULTING

Geochemical & Hydrobiological Solutions Pty Ltd

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Underground Coal Gasification / Coal Seam Gas Investigations
Mineralogical, Geological, Petrographic and Soils Services
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Registered Research and Development
Surface and Groundwater Hydrology

PO Box 1777
Thuringowa, Qld 4817, Australia

Tel: +61 (0) 7 4725 3751

info@candrconsulting.com.au
www.candrconsulting.com.au

ISAAC PLAINS COMPLEX



Groundwater Exceedance Investigation

REPORT PREPARED FOR:



Date: August 2020

CLIENT: STANMORE IP COAL PTY LTD
PROJECT: ISAAC PLAINS COMPLEX
REPORT: GROUNDWATER EXCEEDANCE INVESTIGATION
DATE: AUGUST 2020



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Handwritten signature of Christopher Cuff in black ink.

Dr Chris Cuff
Director

5/8/2020

Date

Handwritten signature of Cecily Rasmussen in black ink.

Dr Cecily Rasmussen
Director

5/8/2020

Date



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6. The assessment of the site/s is based on information supplied by the client, and on-site inspections by C&R Consulting.
7. The report reflects both the information provided to C&R Consulting in documents made available for review and the results of observations and consultations by C&R Consulting staff.



SUMMARY OF RELEVANT INFORMATION

Project Title	Groundwater Exceedance Investigation
Property Location	Isaac Plains Complex
Property Description	Open-cut coal mine
Project Purpose	Undertake an investigation into the potential for environmental harm in accordance with EA Condition C46
Project Number	20060
Client's Details	
Nominated Representative	Belinda Parfitt
Title/Position	Senior Advisor – Health, Safety, Environment and Community
Company	Stanmore IP Coal Pty Ltd
Telephone	0437 931 172
Email	Belinda.parfitt@stanmorecoal.com.au
Author's Details	
Primary Author	Sian Kennare
Qualifications	Masters of Environmental Management (Major - Groundwater Hydrology)

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1. INTRODUCTION

Stanmore IP Coal Pty Ltd (Stanmore) operates the Isaac Plains Complex (IPC) under environmental authority (EA) EPML00932713, dated 24 January 2018. The IPC includes both the Isaac Plains Mine (IPM) and Isaac Plains East (IPE) open-cut coal projects.

In accordance with EA Condition **C45**, IPC monitor groundwater levels and water quality on a quarterly basis from a network of eleven groundwater monitoring bores within close proximity to the mining leases. Two of the monitoring bores, Burton Coal Bore 2 and Swamp Bore 1, are assessed against groundwater contaminant triggers (GCTs) defined in EA Table 12.

During April 2020, quarterly water quality monitoring results from Burton Coal Bore 2 and Swamp Bore 1 exceeded multiple GCTs. In accordance with EA Condition **C46**, Stanmore have enlisted C&R Consulting Pty Ltd (C&R) to investigate the potential for environmental harm resulting from the exceedances.

It should be noted that since the April 2020 monitoring round was completed, IPC completed an EA amendment that included changing some groundwater contaminant limits.

1.1 SCOPE

This investigation will examine the potential for environmental harm from the April 2020 groundwater exceedances through:

- Statistical analysis of the standing water levels and water quality of Burton Coal Bore 2 and Swamp Bore 1;
- Examination of the climatic conditions influencing groundwater levels and quality; and
- Assessment of mining activities on groundwater levels and quality.

If/as required, this investigation will also make recommendations for appropriate actions to prevent further exceedances.



2. BACKGROUND

2.1 MINE DETAILS AND LOCATION

IPC is located within the Isaac Regional Council on both freehold land and state leasehold land in Central Queensland, approximately 10 km to the northeast of Moranbah and 140 km southwest of Mackay (Figure 1). The project is situated immediately north of the Peak Downs Highway between Moranbah and Coppabella, and has a rail loop off the south of the Goonyella branch rail line (Figure 1).

Historically, IPC operations have been conducted on ML70342, separated into five primary pits: N1, N2, S1, S2 and the S3 pits. The N pits are north of Smokey Creek, which bisects the mining lease area. The three S pits are south of this watercourse, with the S3 pit currently acting as the main water storage for the site. IPE operations were granted approval in 2018, involving the expansion of IPC operations into ML700016, ML700017, ML700018 and ML700019.

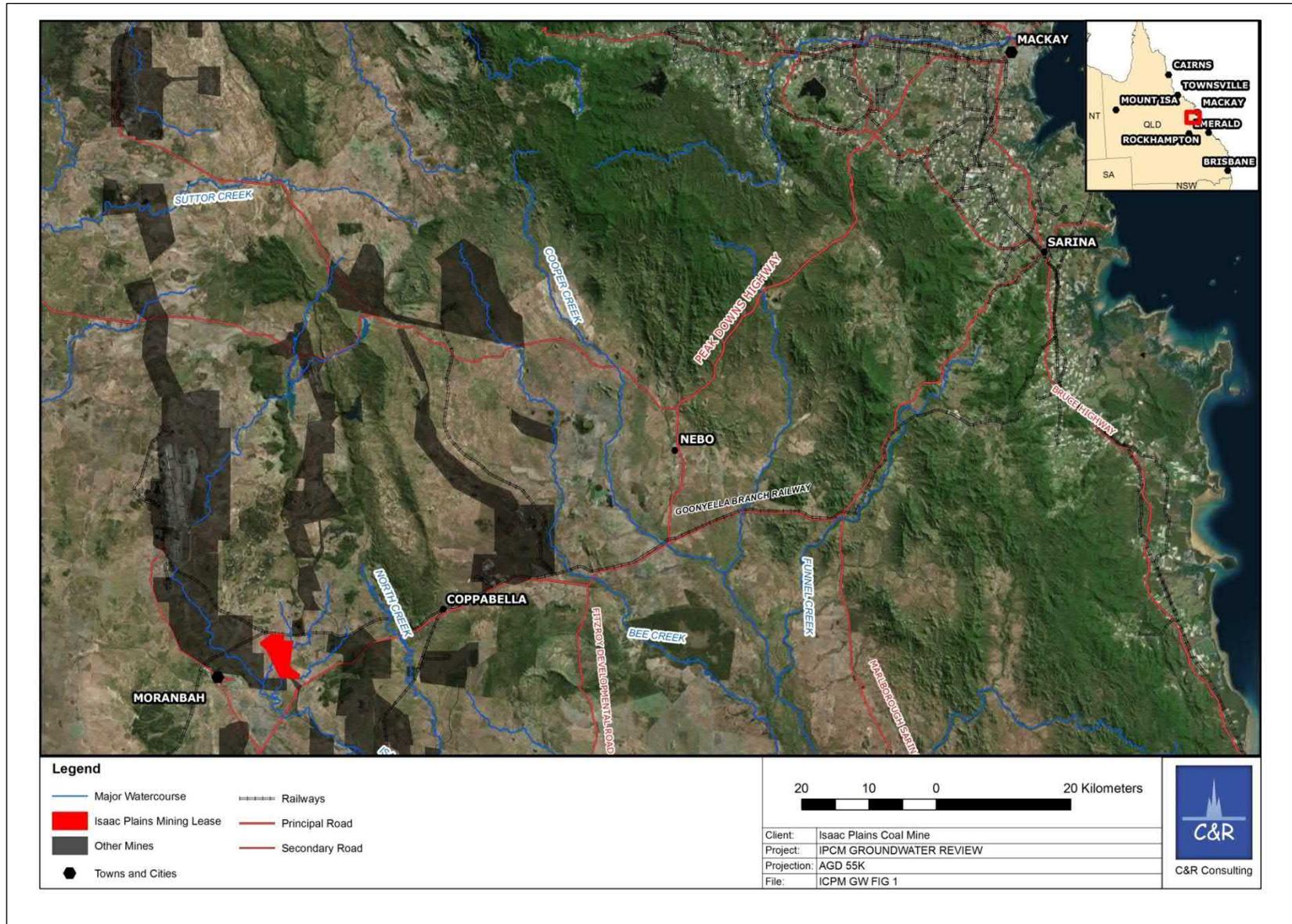


Figure 1: IPC location within Central Queensland.

2.2 RAINFALL

Rainfall in Central Queensland's seasonally arid tropics is notoriously inconsistent in its intensity, duration and location. The climate of the area is dominated by intense rainfall events throughout the summer months (wet season). These rainfall events are often highly variable in their spatial and temporal distribution, with most rain falling in distinct, spatially separated cells across the landscape.

Minimal rain falls throughout the dry season, with an occasional shower in June or July. Evaporation tends to exceed rainfall for almost all days of the year except during intense rainfall events. The extended dry season causes baking and crusting of surface soils. These processes cause greatly reduced infiltration of surface soils unless suitable pre-wetting is provided by gentle rain prior to the wet season. During the onset of the wet season, in the absence of gentle pre-wetting rains, more than 90% of rainfall can eventuate as runoff throughout catchments, reporting to waterways and altering stage-discharge relationships beyond modelled capacities. Even in the event of pre-wetting, the rainfall intensity is often high enough to exceed the infiltration capacity of the soils, generating significant runoff. This increased runoff has the potential to increase the volume of sediments delivered to waterways and result in sediment movement throughout waterways.

Rainfall data from the Bureau of Meteorology stations at the Moranbah water treatment plant (April 1972 to January 2012) and the Moranbah airport (February 2012 to present) are displayed in Figure 2. Application of a 5-year running average shows a cyclicity of wet and dry periods over the last 47 years. The cycle appears to peak every 10-15 years. The chart shows that, over the most recent 7 years (since 2012), the dry period can be characterised as both lasting longer than usual and the driest on record.

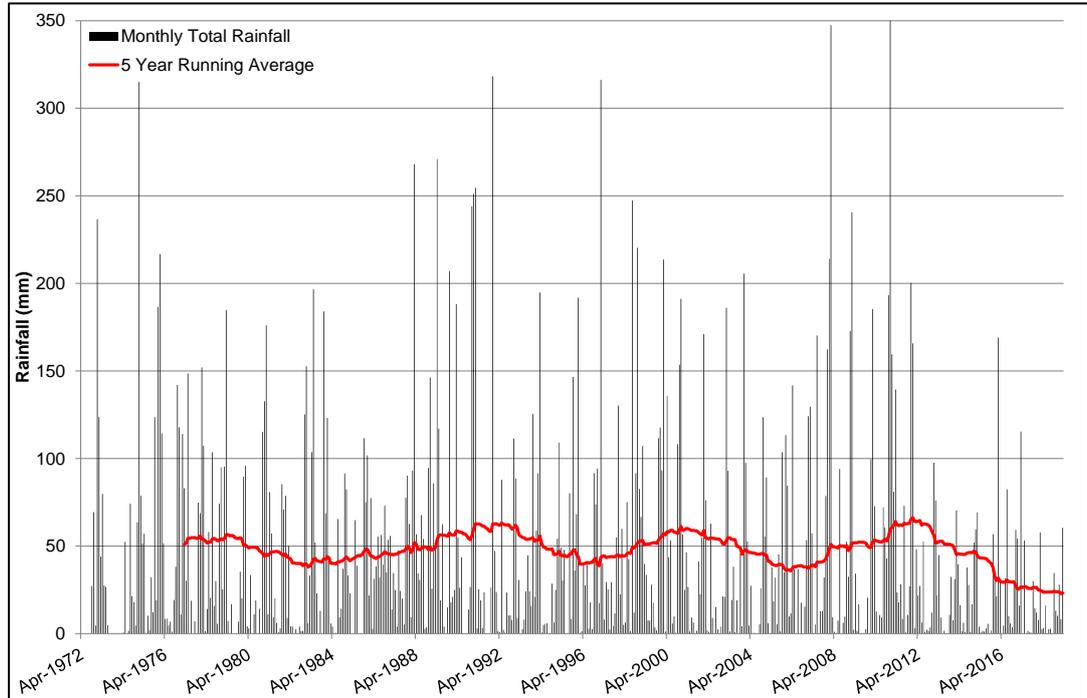


Figure 2: Monthly rainfall totals and 5-year running average.



2.3 REGIONAL HYDROGEOLOGY

There are three principal hydrostratigraphic units within the Isaac Plains tenement areas:

- Recent sediments (alluvium and colluvium);
- Cenozoic (formerly Tertiary) basalt; and
- Late Permian Rangel and Fort Cooper coal measures: sandstone, siltstone and coal (see Table 1).

The alluvium and colluvium are associated with channel deposits of Smokey Creek and the Isaac River (Table 1). Cenozoic basalt crops out to the northeast of tenement ML70342 and particular basalt flows constitute aquifers in several surrounding areas. Confinement of the Late Permian strata is variable locally, depending on pressure distribution and depth. Stratigraphic descriptions for each unit are provided in Table 1.

Surface distribution of each unit is complicated by several regional structures, including at least one syncline, and thrust faults truncating the eastward-dipping target beds. The aquifers of the Isaac Plains area are described in the subsequent sections, with reference made to aquifer characteristics, groundwater flow and groundwater quality for each unit.



Table 1: Stratigraphic units of the Isaac Plains region.

Map Sym [#]	Age	Group	Name/Formation	Short Description
Cza	Quaternary		Alluvium	Alluvium: mud, sand, minor gravel Colluvium and residual soil: mud, sand, gravel ^{##}
Czb	Cenozoic		Cenozoic basalt	Basalt flows
Czs*			Suttor formation*	Sandstone, mudstone, claystone
Ki*	Cretaceous		Unnamed*	Intrusives: granodiorite, diorite, gabbro
TRr	Triassic	Rewan Gp.	Rewan fm.	Green lithic sandstone, green and red sandstone and mudstone
Pwj	Permian	Blackwater Group	Rangal coal measures	Lithic sandstone, coal, siltstone, carbonaceous shale, mudstone (locally cherty), rare, pebbly sandstone
Pwt			Fort Cooper coal measures	Medium to coarse-grained, volcanolithic sandstone, conglomerate, tuff, tuffaceous mudstone, coal, shale
Pwb*			Mooranbah coal measures*	Lithic sandstone, siltstone, shale, coal, mudstone, conglomerate
Pb*		Back Creek Group*	Marine sandstone, siltstone, shale	

[#]Map symbols as per 1:100,000 geological maps Harrybrandt (8554) and Grosvenor Downs (8553) (GSQ, 2014).

*Formation/unit is present outside the lease area and is not discussed at length in the text.

^{##}Several generations of alluvium and colluvium exist, but only the older, more substantive one is mapped in 1:100,000 geological maps Harrybrandt (8554) and Grosvenor Downs (8553) (GSQ, 2014).



3. GROUNDWATER MONITORING NETWORK

The details of the bores included in the groundwater monitoring programme, as stipulated in the EA Condition **C43**, are summarised in Table 2, with their spatial distribution shown in Figure 3. Table 2 is adapted from EA *Table 11 – Groundwater monitoring locations and frequency*.

It should be noted that EA Table 11 currently refers to Swamp Bore 2. However, C&R has been informed that this is a clerical error and will be amended to Swamp Bore 1 when the next EA amendment is completed.

Several monitoring bores are yet to be commissioned (MB12 – MB16).

Table 2: Groundwater monitoring bores at IPC.

Monitoring Point	Aquifer Type	Easting (GDA 94) ¹	Northing (GDA 94) ¹	Surface RL ² (mAHD) ¹
Burton Coal Bore 2	Rewan Formation	620614.14	7573946.89	240.67
Swamp Bore 1	Rewan Formation	621750.30	7569146.43	245.85
MB1	Coal measures	618792.07	7572213.34	236.54
MB2	Coal measures	619073.69	7573129.11	242.88
MB4a	Quaternary colluvium/Tertiary sediments	620355.06	7567481.37	237.00
MB4b		619625.60	7567072.68	231.44
MB8	Coal measures	618990.97	7570968.22	245.50
MB9	Coal measures	620254.18	7567865.36	238.95
MB10	Tertiary basalt	620255.02	7567872.67	238.94
MB11	Tertiary sediments/weathered Rewan Group	618717.61	7571743.16	231.77

1 - Source: Klohn Crippen Berger (KCB), 2018.

2 - RL: relative level.

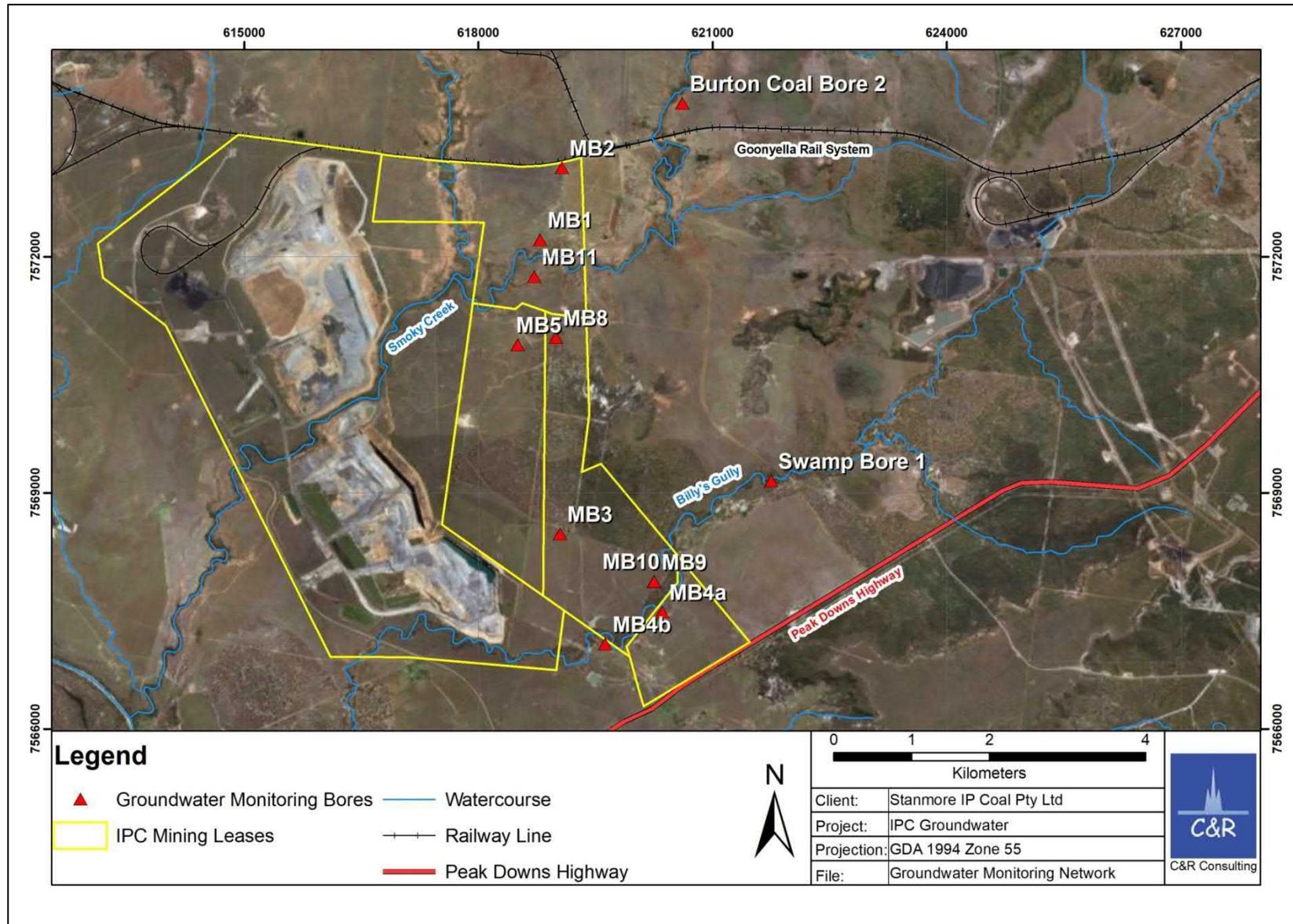


Figure 3: Groundwater monitoring network at IPC.



4. EXCEEDANCE INVESTIGATION

Data supplied to C&R for the purpose of this investigation included Microsoft Excel spreadsheets, laboratory certificates of analysis and groundwater field sheets. Time series charts were generated for each exceeding parameter to identify the potential for trending results. The IBM SPSS software package was used to undertake bivariate correlation analysis between parameters to quantify any observed relationships.

4.1 BURTON COAL BORE 2

Groundwater in the vicinity of the IPC generally follows surface topography in a southwest direction (Klohn Crippen Berger [KCB], 2016). The Burton Coal Bore 2 is positioned hydraulically up-gradient of mining at the IPC, adjacent to Smoky Creek and the Goonyella rail system.

The bore targets the Rewan Group stratigraphic unit, characterised by saline water quality associated with the low hydraulic conductivity and long residence time of the groundwater (KCB, 2016). The aquifer is recharged via rainfall infiltration in areas where the unit outcrops, as well as from seepage from the overlying stratigraphic units (KCB, 2016).

The Burton Coal Bore 2 is not currently used as a water supply (KCB, 2016).

4.1.1 EXCEEDED GROUNDWATER CONTAMINANT TRIGGERS

Multiple exceedances with Burton Coal Bore 2 were noted in the April 2020 round of groundwater monitoring (Table 3).

Table 3: Burton Coal Bore 2 (BCB2) exceedance values in April 2020.

Parameter	Unit	EA Trigger Value	BCB2 April 2020 Value
T - Aluminium	mg/L	0.01	0.07
Chloride	mg/L	1900	2310
Calcium	mg/L	170	193
Total Dissolved Solids	mg/L	3900	4770
Electrical Conductivity	µS/cm	6700	7520
Magnesium	mg/L	230	287

The groundwater contaminant limits stipulated within the EA do not specifically state whether the thresholds are applicable to dissolved or total metal concentrations. If applied against dissolved aluminium levels, there would be no exceedances, as the concentration reported in April was below the limit of reporting (<0.01 mg/L). This is also the average value for dissolved aluminium (<0.1 mg/L) in Burton Coal Bore 2 since January 2016. However, if the contaminant limit is applied to the total aluminium, then the April concentration of 0.07 mg/L would be considered an exceedance (Table 3). The April value for total aluminium is within the historic range, with an overall average concentration of 0.38 mg/L. Considering that the average value calculated since 2016 is far greater than the contaminant limit (<0.01 mg/L) that was determined from site-specific data, it is therefore believed that the contaminant limits stipulated within the EA refer to the dissolved metal concentration. Therefore, the dissolved aluminium concentration captured in April 2020 is classed as compliant.

The recent years of marginal wet seasons has had the effect of concentrating the dissolved solids in the aquifer system. This effect has been compounded by the fact that the region is currently within an extended dry cycle (identified in Section 2.2). The trend of increasing concentration of dissolved solids indicates water is being lost from the system, while salts remain.

Standing water levels in Burton Coal Bore 2 have been recorded since June 2008 (Figure 4). When the standing water levels are overlayed with local rainfall, the bore appears to be highly influenced by rain (or lack thereof), supporting the claim that the aquifer is recharged via rainfall infiltration.

Over the 2011 wet season, the standing water level rose sharply following high rainfall totals and then declined steadily in the following years alongside marginal wet seasons. The level rose again following higher rainfall totals in the 2016 and 2017 wet seasons, but has subsequently declined following dryer years thereafter (Figure 4).

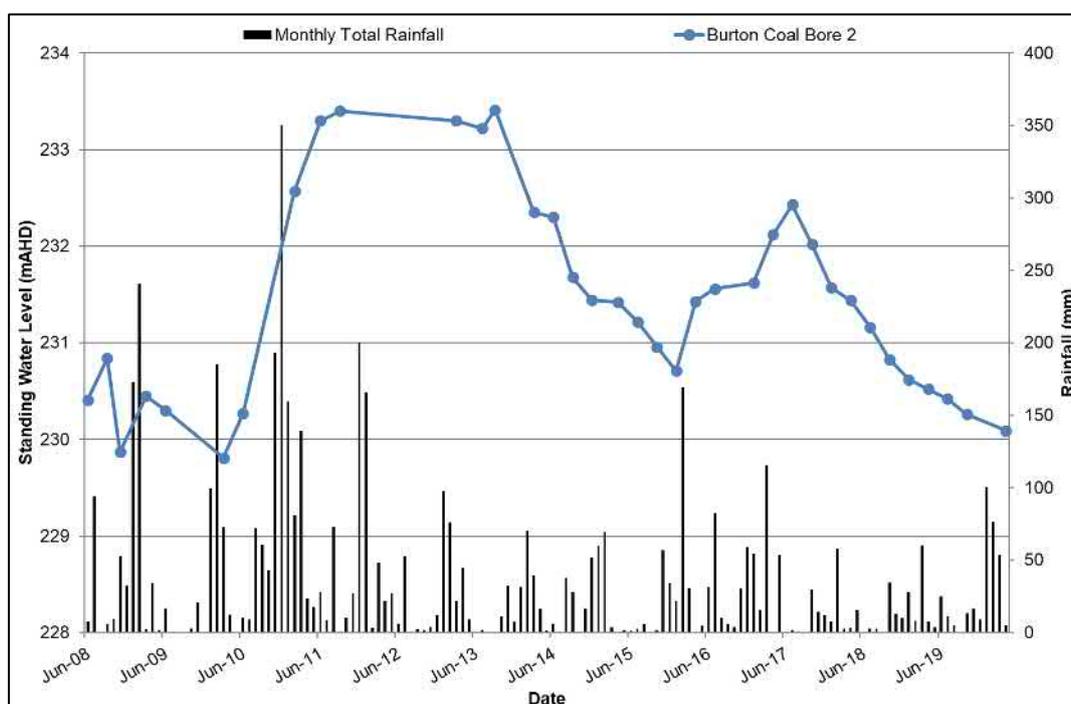


Figure 4: Local rainfall and standing water level in Burton Coal Bore 2

Total dissolved solids (TDS) recorded in Burton Coal Bore 2 since 2010 are occasionally characterised by high variability and both increasing and decreasing trends (Figure 5). The most recent trend has seen an increase in TDS to the point of exceeding the GCT (3900 mg/L) in October 2018 and again in January 2019.

Results from a Pearson correlation analysis reveal the observed trends in TDS are significantly and inversely correlated to the standing water levels ($r = -0.776$, $n = 27$, $p < 0.001$). This correlation is charted in Figure 5 and reveals a clear relationship between the two (note: standing water level has been inversed for visual purposes). Standing water levels and water quality are currently measured on a quarterly basis and have been recorded from Burton Coal Bore 2 on 37 occasions since June 2008.

The observed trends are highly indicative of evapotranspiration processes: the sum of evaporation and plant transpiration. The Burton Coal Bore 2 is located within the riparian corridor of Smoky Creek, surrounded by remnant vegetation consisting of large, deep-rooted trees. Standing water levels in the bore are known to be relatively shallow, with water levels

as shallow as 7.26 m below ground level. The combination of deep tree roots and capillary action can draw water from depths, lowering the zone of saturation and concentrating salts.

The current increasing trend in TDS is therefore inferred to be an expression of the climatic conditions in the area and not resulting from mining impacts. As the TDS and electrical conductivity (EC) are interrelated, similar observations are made for EC (Figure 6).

Three major ions (magnesium, calcium and chloride) exceeded the trigger values in Burton Coal Bore 2. Time series charts for these ions are displayed in Figure 5 through Figure 9. Each chart shows both the increasing and decreasing periods closely related to TDS trends.

While TDS in Burton Coal Bore 2 is above the ANZECC (Australian and New Zealand Environment and Conservation Council) and ARMCANZ (Agricultural and Resource Management Council of Australia and New Zealand) (2000) salinity tolerance for beef cattle (4000 mg/L), the bore is not currently used to supply livestock drinking water.

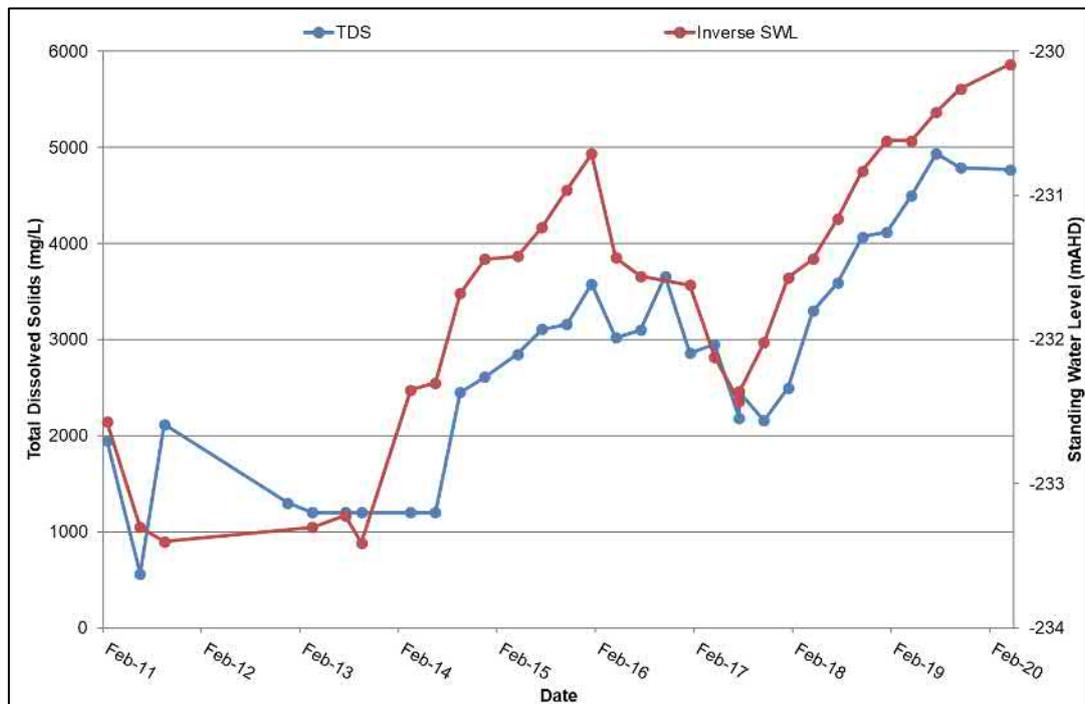


Figure 5: Total dissolved solids and inverse standing water level in Burton Coal Bore 2.

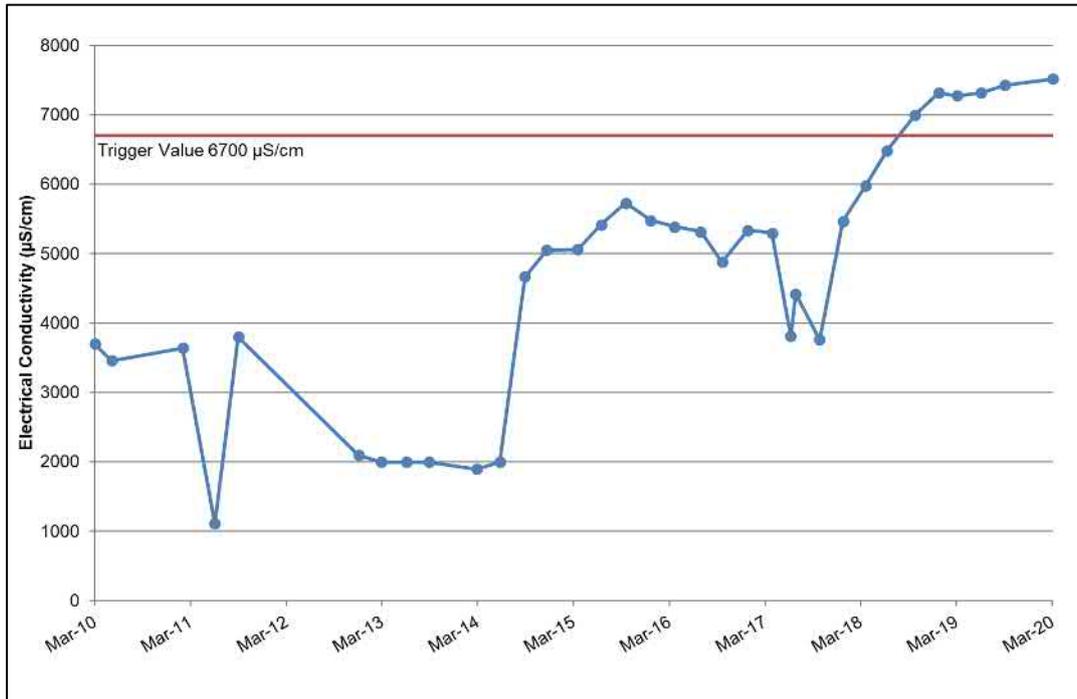


Figure 6: Electrical conductivity in Burton Coal Bore 2.

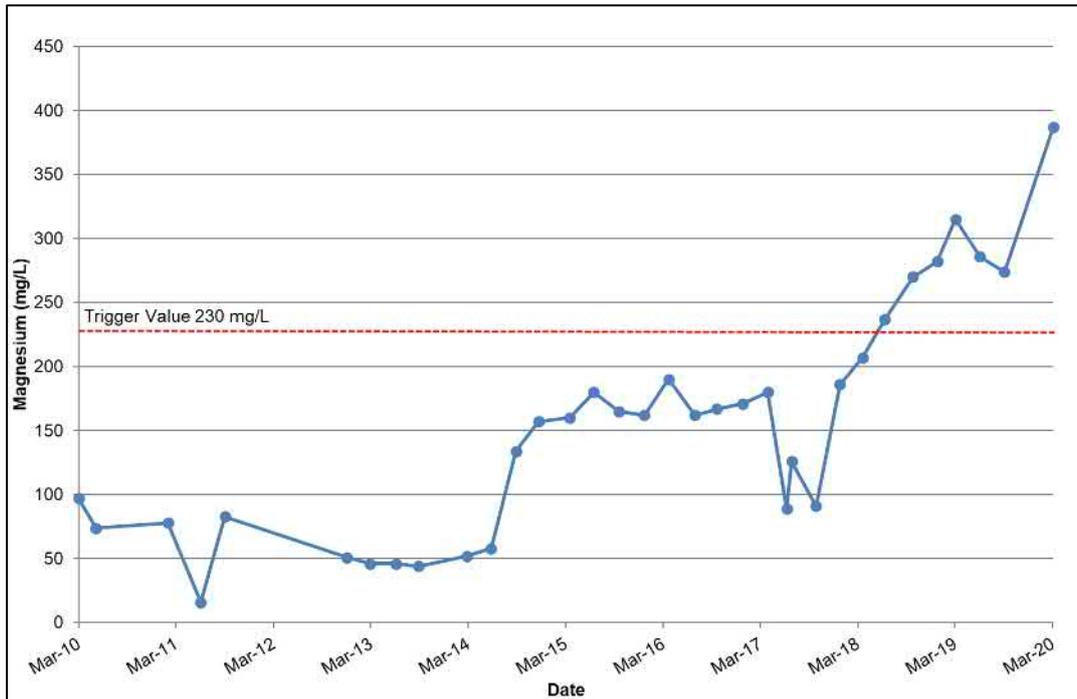


Figure 7: Magnesium in Burton Coal Bore 2.

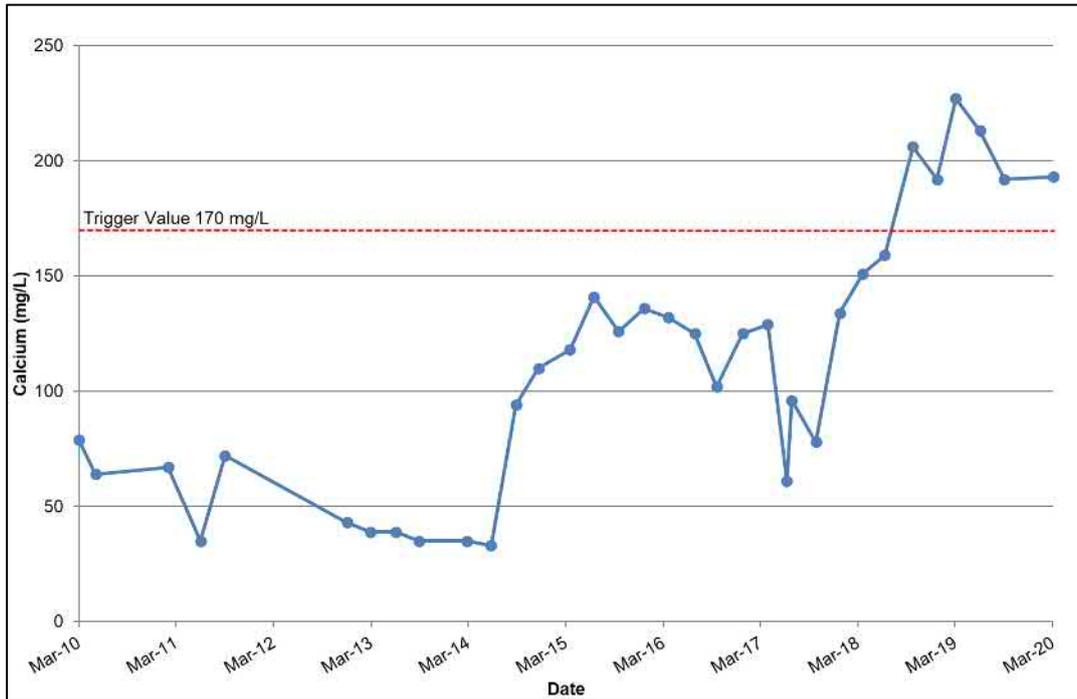


Figure 8: Calcium in Burton Coal Bore 2.

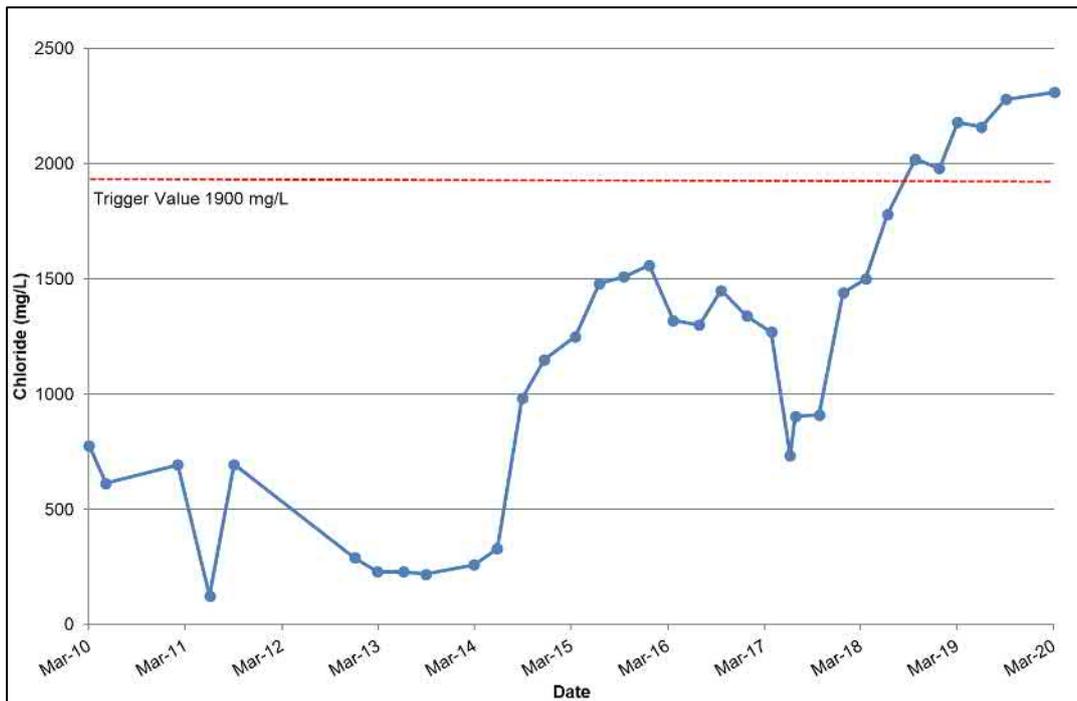


Figure 9: Chloride in Burton Coal Bore 2.



4.2 SWAMP BORE 1

Groundwater in the vicinity of the IPC generally follows surface topography in a southwest direction (KCB, 2016). The Swamp Bore 1 is positioned hydraulically up-gradient of mining at the IPC, within close proximity to Billy's Gully.

The bore targets the Rewan Group stratigraphic unit, characterised by saline water quality associated with the low hydraulic conductivity and long residence time of the groundwater (KCB, 2016). The aquifer is recharged via rainfall infiltration in areas where the unit outcrops, as well as from seepage from the overlying stratigraphic units (KCB, 2016).

The Swamp Bore 1 is not currently used as a water supply, although it is positioned directly opposite a bore that is utilised for stock water supply (KCB, 2016).

4.2.1 EXCEEDED GROUNDWATER CONTAMINANT TRIGGERS

It should be noted that the "Client Sample ID" references within the *Certificate of Analysis* refers to Swamp Bore 1 as SB1.

Three non-compliances have been detected within the Swamp Bore 1 April 2020 water quality sample. However, the same conditions as discussed for Burton Coal Bore 2 apply to Swamp Bore 1: whether the contaminant limit stipulated within the EA refers to the dissolved or total metal concentrations.

It should be noted that the initial exceedance notification completed by Stanmore on the 28 April 2020 via WaTERS stated four exceedances had occurred. However, upon further review, the exceedance regarding molybdenum was incorrect. The April 2020 concentration of molybdenum in both the dissolved and total fraction are below or equal to the contaminant limit of 0.001 mg/L. Hence, this is not classified as an exceedance.

Table 4: Swamp Bore 1 exceedance values in April 2020.

Parameter	Unit	EA Trigger Value	Swamp Bore 1 April 2020 Value
T - Aluminium	mg/L	0.01	0.15
T- Arsenic	mg/L	0.001	0.002
T - Iron	mg/L	1	1.14

Dissolved and total aluminium was recorded as <0.01 mg/L and 0.15 mg/L, respectively, in April. Historically, only one instance (October 2018) of dissolved aluminium was detected above the limit of reporting. In comparison, the total aluminium average since 2016 is 0.06 mg/L, six times the contaminant limit of 0.01 mg/L. These historic concentrations support the notion that the contaminant limits listed within the EA apply to the dissolved metals. Therefore, no exceedance for aluminium has occurred.

The groundwater contaminant limit for arsenic is equal to the limit of reporting (0.001 mg/L). In April, dissolved and total arsenic was recorded as <0.001 mg/L and 0.002 mg/L, respectively. The concentration of 0.002 mg/L for the total arsenic fraction is within the historical range for Swamp Bore 1. Although above the EA contaminant limit, 0.002 mg/L is far below the Livestock Drinking Water guideline value of 0.5 mg/L. Therefore, the April 2020 arsenic concentration is deemed to have no detrimental impact to the surrounding groundwater environmental values.



Dissolved and total iron was recorded as 0.54 mg/L and 1.14 mg/L, respectively, in April, in comparison to the contaminant limit of 1 mg/L. The historic average for dissolved iron in Swamp Bore 1 equals 0.42 mg/L, which is more than half the average for total iron (1.01 mg/L) over the same period. The April level remains within the historic range for Swamp Bore 1. Total iron concentrations display far greater variation, which is often correlated to the level of TDS found within the sample. Iron is most often found in colloidal form. Iron colloids levels can be elevated within the bore column due to pumping techniques, recent rainfall, borehole integrity or a natural reflection of the target geology.

Given the preceding discussion, the iron concentrations for Swamp Bore 1 are considered to be compliant.

5. CONCLUSIONS AND RECOMMENDATIONS

Groundwater in the vicinity of the IPC generally follows surface topography in a southwest direction (KCB, 2016). The Burton Coal Bore 2 and Swamp Bore 1 are positioned hydraulically up-gradient of mining at the IPC. The bores target the Rewan Group stratigraphic unit which is characterised by saline water quality resulting from the low hydraulic conductivity and long residence time of the groundwater (KCB, 2016). The aquifer is recharged via rainfall infiltration in areas where the unit outcrops, as well as from seepage from the overlying stratigraphic units (KCB, 2016).

Examination of local rainfall data dating back to 1972 has identified a 10-year cyclical trend of wet and dry periods. The past seven years have witnessed an extended dry period, with the 5-year average rainfall dropping to the lowest observed over the 47-year record.

The standing water level in the Burton Coal Bore 2 has been shown to be strongly influenced by local rainfall (Figure 4). Consequently, the standing water level in the bore has shown a downward trend in the recent years of marginal rainfall totals. Statistical analysis has also determined a significant and inverse correlation between the standing water level and TDS in the bore. From this observation, it is inferred that the system is losing water through processes of evapotranspiration, and not seepage or mine dewatering.

Higher TDS and EC levels are driven by the larger concentrations of the major ions contributing to water quality. Thus, the exceedances of TDS and EC are a representation of the increasing trends in the major ions associated with high evapotranspiration and low rainfall.

The current groundwater trigger levels for both water quality and standing water levels fail to account for the long-term variability in climatic systems governing groundwater conditions.

While TDS in Burton Coal Bore 2 is above the ANZECC (Australian and New Zealand Environment and Conservation Council) and ARMCANZ (Agricultural and Resource Management Council of Australia and New Zealand) (2000) salinity tolerance for beef cattle (4000 mg/L), the bore is not currently used as a water supply (KCB, 2016) and therefore has no projected impacts on groundwater users. As the observed processes are determined to be the result of natural climatic variation, exceedances, along with results for metals and hydrocarbons compliant with the GCTs, have been determined to have minimal potential to cause environmental harm.

The EA does not specifically state which metal concentration (dissolved or total) the contaminant limit applies to. Further, the particular methodology used to gain such limits remains unresolved. Three possible exceedances have occurred if the contaminant limit is applied to the total concentration of aluminium, arsenic and iron. However, as the contaminant limits are presumed to be determined using historical, site-specific groundwater bore data, C&R believe the contaminant limits are to be applied to the dissolved metals. This is supported by the concentration of dissolved aluminium remaining equal to or below the limit of reporting since 2016 in both Swamp Bore 1 and Burton Coal Bore 2. Hence, the contaminant limit is equal to the limit of reporting.

It is acknowledged that the EA groundwater contaminant limits (EA Table 12) have been modified during the most recent EA amendment, approved on 7 May 2020. However, C&R believe the following recommendations remain relevant to ensure groundwater compliance and the ability to accurately detect changes within the applicable groundwater systems.



Recommendations:

- Review and update current GCT compliance methods (if applicable) to current best practice methods that require consecutive exceedances of a defined limit (i.e. DSITI, 2017 – *Using monitoring data to assess groundwater quality and potential environmental impacts*).
- Ensure the nomenclature is consistent with the EA and laboratory analyses.
- Amend EA Table 12 to specify the applicable metal concentration (i.e. total or dissolved).



6. REFERENCES

ANZECC (Australian and New Zealand Environment and Conservation Council) and ARMCANZ (Agricultural and Resource Management Council of Australia and New Zealand) (2000). *Australian and New Zealand guidelines for fresh and marine water quality*. National Water Quality Management Strategy. Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

KCB (Klohn Crippen Berger) (2016). *Isaac Plains East Project – Groundwater Report*.

KCB (Klohn Crippen Berger) (2018). *Isaac Plains Mine Groundwater Monitoring and Management Plan*.

CLIENT: STANMORE IP COAL PTY LTD
PROJECT: ISAAC PLAINS COMPLEX
REPORT: GROUNDWATER EXCEEDANCE INVESTIGATION
DATE: AUGUST 2020



APPENDIX 1: APRIL 2020 COA

CERTIFICATE OF ANALYSIS

Work Order : **EB1909239**
Client : **STANMORE IP COAL PTY LTD**
Contact : BELINDA PARFITT
Address : ALS MACKAY 78 HARBOUR ROAD
 MACKAY QUEENSLAND 4740
Telephone : 07 4816 7444
Project : IPCM
Order number : P102091
C-O-C number : ----
Sampler : SCOTT AULSEBROOK
Site : ----
Quote number : TV/005/19
No. of samples received : 17
No. of samples analysed : 11

Page : 1 of 12
Laboratory : Environmental Division Brisbane
Contact : Anna Riddell
Address : 2 Byth Street Stafford QLD Australia 4053
Telephone : +61 7 4952 5795
Date Samples Received : 16-Apr-2019 08:20
Date Analysis Commenced : 18-Apr-2019
Issue Date : 02-May-2019 09:50



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Diana Mesa	2IC Organic Chemist	Brisbane Organics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Organic Chemist	Brisbane Organics, Stafford, QLD
Tom Maloney	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EG020-T (Total Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- It is recognised that EG020T (Total Metals) is less than EG020F (Dissolved Metals) for some samples. However, the difference is within experimental variation of the methods.
- EG020-F (Dissolved Metals by ICP-MS): Limit of reporting raised due to matrix interference.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time				15-Apr-2019 13:35	15-Apr-2019 08:40	15-Apr-2019 15:00	15-Apr-2019 10:45	15-Apr-2019 09:50	
Compound	CAS Number	LOR	Unit	EB1909239-001	EB1909239-002	EB1909239-004	EB1909239-006	EB1909239-007	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	7.15	7.25	7.30	7.34	7.32	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	8870	7280	18400	3360	7840	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	6370	4500	12700	1840	4550	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	<5	54	<5	30	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	58	613	201	526	776	
Total Alkalinity as CaCO3	----	1	mg/L	58	613	201	526	776	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	104	100	38	159	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	3130	2180	6530	849	2220	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	608	227	610	97	154	
Magnesium	7439-95-4	1	mg/L	137	315	232	116	198	
Sodium	7440-23-5	1	mg/L	1180	1020	3190	525	1460	
Potassium	7440-09-7	1	mg/L	22	5	18	3	8	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.02	
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	0.006	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	<0.001	0.008	0.036	
Barium	7440-39-3	0.001	mg/L	0.217	0.148	0.803	0.125	0.135	
Molybdenum	7439-98-7	0.001	mg/L	0.001	<0.001	0.129	0.001	0.002	
Rubidium	7440-17-7	0.001	mg/L	0.032	0.010	0.039	0.003	0.012	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	8.37	5.52	47.8	2.11	4.57	
Iron	7439-89-6	0.05	mg/L	0.23	<0.05	<0.05	0.05	0.43	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.03	0.70	0.02	0.65	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time					15-Apr-2019 13:35	15-Apr-2019 08:40	15-Apr-2019 15:00	15-Apr-2019 10:45	15-Apr-2019 09:50
Compound	CAS Number	LOR	Unit		EB1909239-001	EB1909239-002	EB1909239-004	EB1909239-006	EB1909239-007
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L		<0.001	<0.001	0.010	<0.001	<0.001
Arsenic	7440-38-2	0.001	mg/L		0.002	<0.001	0.001	0.007	0.034
Barium	7440-39-3	0.001	mg/L		0.227	0.135	3.59	0.114	0.141
Molybdenum	7439-98-7	0.001	mg/L		<0.001	<0.001	0.162	0.002	0.003
Selenium	7782-49-2	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
Silver	7440-22-4	0.001	mg/L		<0.001	<0.001	<0.001	<0.001	<0.001
Strontium	7440-24-6	0.001	mg/L		8.49	5.50	51.0	2.17	4.67
Iron	7439-89-6	0.05	mg/L		0.19	0.08	3.97	0.08	1.35
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.1	0.1	0.4	0.4
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		<0.01	0.01	0.03	<0.01	0.04
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		92.0	75.9	190	35.2	81.4
Total Cations	----	0.01	meq/L		93.5	81.7	189	37.3	87.7
Ionic Balance	----	0.01	%		0.82	3.70	0.41	2.83	3.70
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	SB1	BC2	MB7	MB1	MB2
Client sampling date / time					15-Apr-2019 13:35	15-Apr-2019 08:40	15-Apr-2019 15:00	15-Apr-2019 10:45	15-Apr-2019 09:50
Compound	CAS Number	LOR	Unit		EB1909239-001	EB1909239-002	EB1909239-004	EB1909239-006	EB1909239-007
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		96.7	94.3	94.3	95.0	91.8
Toluene-D8	2037-26-5	2	%		99.0	100	102	102	100
4-Bromofluorobenzene	460-00-4	2	%		99.0	95.1	97.1	98.9	97.3



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time				15-Apr-2019 08:37	15-Apr-2019 07:15	15-Apr-2019 12:20	15-Apr-2019 15:10	15-Apr-2019 16:00	
Compound	CAS Number	LOR	Unit	EB1909239-009	EB1909239-010	EB1909239-013	EB1909239-014	EB1909239-015	
				Result	Result	Result	Result	Result	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.95	7.55	7.45	7.38	7.87	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	50800	30200	12000	10800	1890	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	42400	20400	7880	7170	1110	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	1180	1290	133	<5	8	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	398	1150	183	102	566	
Total Alkalinity as CaCO3	----	1	mg/L	398	1150	183	102	566	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	918	384	126	<1	91	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	19000	10500	4180	3860	255	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	622	84	374	360	47	
Magnesium	7439-95-4	1	mg/L	1830	446	126	155	85	
Sodium	7440-23-5	1	mg/L	9010	6400	2270	1820	306	
Potassium	7440-09-7	1	mg/L	2	3	14	20	5	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	0.02	
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.005	0.002	0.002	
Barium	7440-39-3	0.001	mg/L	0.204	0.173	0.637	8.38	0.171	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	0.007	0.005	<0.001	0.020	
Rubidium	7440-17-7	0.001	mg/L	0.007	<0.005	0.026	0.032	0.008	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	0.007	<0.005	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	20.5	6.62	20.5	13.6	0.752	
Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	<0.05	0.45	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	6.02	11.9	1.79	0.14	0.27	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time				15-Apr-2019 08:37	15-Apr-2019 07:15	15-Apr-2019 12:20	15-Apr-2019 15:10	15-Apr-2019 16:00	
Compound	CAS Number	LOR	Unit	EB1909239-009	EB1909239-010	EB1909239-013	EB1909239-014	EB1909239-015	
				Result	Result	Result	Result	Result	
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	0.007	0.008	0.005	0.001	0.002	
Barium	7440-39-3	0.001	mg/L	0.249	0.294	0.736	9.53	0.222	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	0.008	0.005	<0.001	0.021	
Selenium	7782-49-2	0.01	mg/L	<0.05	<0.05	<0.01	<0.01	<0.01	
Silver	7440-22-4	0.001	mg/L	<0.005	<0.005	<0.001	<0.001	<0.001	
Strontium	7440-24-6	0.001	mg/L	22.6	7.34	20.0	13.2	0.748	
Iron	7439-89-6	0.05	mg/L	9.89	26.2	1.90	0.72	0.46	
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.6	0.2	0.1	0.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.16	0.26	0.04	0.01	0.07	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	563	327	124	111	20.4	
Total Cations	----	0.01	meq/L	574	319	128	110	22.8	
Ionic Balance	----	0.01	%	0.93	1.21	1.56	0.24	5.52	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	MB4A	MB4B	MB8B	MB9A	MB9B
Client sampling date / time				15-Apr-2019 08:37	15-Apr-2019 07:15	15-Apr-2019 12:20	15-Apr-2019 15:10	15-Apr-2019 16:00	
Compound	CAS Number	LOR	Unit	EB1909239-009	EB1909239-010	EB1909239-013	EB1909239-014	EB1909239-015	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	99.9	94.7	91.4	90.0	94.7	
Toluene-D8	2037-26-5	2	%	97.4	104	104	98.1	101	
4-Bromofluorobenzene	460-00-4	2	%	97.2	102	98.9	95.4	97.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		IPCM GW Duplicate	----	----	----	----
Client sampling date / time		15-Apr-2019 00:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1909239-017	-----	-----	-----	-----
				Result	----	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	7.30	----	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	8890	----	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	6100	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	51	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	51	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	3120	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	608	----	----	----	----
Magnesium	7439-95-4	1	mg/L	133	----	----	----	----
Sodium	7440-23-5	1	mg/L	1150	----	----	----	----
Potassium	7440-09-7	1	mg/L	22	----	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.226	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.001	----	----	----	----
Rubidium	7440-17-7	0.001	mg/L	0.034	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	8.85	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.30	----	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.03	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	----	----	----	----
Client sampling date / time				15-Apr-2019 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1909239-017	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EG020T: Total Metals by ICP-MS - Continued									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	0.235	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	0.001	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	----
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	----	----
Strontium	7440-24-6	0.001	mg/L	8.51	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.26	----	----	----	----	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	----	----	----	----	----
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	91.6	----	----	----	----	----
Total Cations	----	0.01	meq/L	91.9	----	----	----	----	----
Ionic Balance	----	0.01	%	0.16	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	IPCM GW Duplicate	----	----	----	----
Client sampling date / time				15-Apr-2019 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EB1909239-017	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	----
[^] Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
[^] Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	90.5	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	103	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	96.0	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

APPENDIX D

Isaac Plains Complex Groundwater Sampling Results January/ February 2021 and April 2021

Matrix:	WATER			Sample Type:	REG	REG	REG	REG	REG
Workgroup:	EB2102469			ALS Sample Number:	EB2102469001	EB2102469002	EB2102469003	EB2102469004	EB2102469005
Project name/number:	IPCM			Sample Date:	26/01/2021	26/01/2021	27/01/2021	28/01/2021	22/01/2021
				Client sample ID (1st):	BC2	MB2	MB4A	Field Blank	Trip Blank
				Client sample ID (2nd):	Burton Coal Bore	Groundwater	Groundwater		
				Depth Type:					
				Depth (m):					
				Site:	Isaac Plains	Isaac Plains	Isaac Plains	Isaac Plains	Isaac Plains
				Purchase Order:	P1002091	P1002091	P1002091	P1002091	P1002091
Analyte grouping/Analyte	CAS Number	Unit	Limit of reporting						
EA005P: pH by PC Titrator									
pH Value		pH Unit	0.01		7.59	7.77	7.73	6.67	----
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C		µS/cm	1		7810	7140	51800	<1	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C		mg/L	10		5320	4320	43600	<10	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)		mg/L	5		8	10	1800	<5	----
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1		<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1		<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1		616	738	378	2	----
Total Alkalinity as CaCO3		mg/L	1		612	738	378	2	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1		111	163	971	<1	----
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	mg/L	1		2750	1980	20000	<1	----
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	mg/L	1		252	107	665	<1	----
Magnesium	7439-95-4	mg/L	1		369	156	1880	<1	----
Sodium	7440-23-5	mg/L	1		1130	1260	9920	<1	----
Potassium	7440-09-7	mg/L	1		6	7	4	<1	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	mg/L	0.01		<0.01	<0.01	<0.05	<0.01	----
Antimony	7440-36-0	mg/L	0.001		<0.001	<0.001	<0.005	<0.001	----
Arsenic	7440-38-2	mg/L	0.001		0.002	0.034	<0.005	<0.001	----
Barium	7440-39-3	mg/L	0.001		0.143	0.125	0.204	<0.001	----
Molybdenum	7439-98-7	mg/L	0.001		0.001	0.002	<0.005	<0.001	----
Rubidium	7440-17-7	mg/L	0.001		0.014	0.013	0.009	<0.001	----
Selenium	7782-49-2	mg/L	0.01		<0.01	<0.01	<0.05	<0.01	----
Silver	7440-22-4	mg/L	0.001		<0.001	<0.001	0.006	<0.001	----
Strontium	7440-24-6	mg/L	0.001		6.82	4.24	24.3	<0.001	----
Iron	7439-89-6	mg/L	0.05		<0.05	0.07	<0.05	<0.05	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	mg/L	0.01		<0.01	0.07	4.43	<0.01	----
Antimony	7440-36-0	mg/L	0.001		<0.001	<0.001	<0.005	<0.001	----
Arsenic	7440-38-2	mg/L	0.001		0.002	0.034	<0.005	<0.001	----
Barium	7440-39-3	mg/L	0.001		0.146	0.139	0.214	<0.001	----
Molybdenum	7439-98-7	mg/L	0.001		0.001	0.003	<0.005	<0.001	----
Selenium	7782-49-2	mg/L	0.01		<0.01	<0.01	<0.05	<0.01	----
Silver	7440-22-4	mg/L	0.001		<0.001	<0.001	<0.005	<0.001	----
Strontium	7440-24-6	mg/L	0.001		7.25	4.38	25.7	<0.001	----
Iron	7439-89-6	mg/L	0.05		<0.05	0.40	8.14	<0.05	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	----
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	mg/L	0.1		0.2	0.4	0.2	<0.1	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P		mg/L	0.01		<0.01	0.03	0.08	<0.01	----
EN055: Ionic Balance									
Total Anions		meq/L	0.01		92.1	74.0	592	0.04	----
Total Cations		meq/L	0.01		92.2	73.2	620	<0.01	----
Ionic Balance		%	0.01		0.07	0.56	2.28	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction		µg/L	20		<20	<20	<20	<20	<20
C10 - C14 Fraction		µg/L	50		<50	<50	<50	<50	----
C15 - C28 Fraction		µg/L	100		<100	<100	<100	<100	----
C29 - C36 Fraction		µg/L	50		<50	<50	<50	<50	----
C10 - C36 Fraction (sum)		µg/L	50		<50	<50	<50	<50	----

EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	µg/L	20		<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20		<20	<20	<20	<20	<20
>C10 - C16 Fraction		µg/L	100		<100	<100	<100	<100	----
>C16 - C34 Fraction		µg/L	100		<100	<100	<100	<100	----
>C34 - C40 Fraction		µg/L	100		<100	<100	<100	<100	----
>C10 - C40 Fraction (sum)		µg/L	100		<100	<100	<100	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	µg/L	1		<1	<1	<1	<1	<1
Toluene	108-88-3	µg/L	2		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	µg/L	2		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	µg/L	2		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	µg/L	2		<2	<2	<2	<2	<2
Total Xylenes		µg/L	2		<2	<2	<2	<2	<2
Sum of BTEX		µg/L	1		<1	<1	<1	<1	<1
Naphthalene	91-20-3	µg/L	5		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	%	2		103	101	108	99.2	101
Toluene-D8	2037-26-5	%	2		98.8	99.0	96.3	97.5	99.1
4-Bromofluorobenzene	460-00-4	%	2		109	109	111	107	108

Matrix:	WATER			Sample Type:	REG	REG	REG								
Workgroup:	EB2105277			ALS Sample Number:	EB2105277001	EB2105277002	EB2105277003	EB2105277004	EB2105277005	EB2105277006	EB2105277007	EB2105277008	EB2105277009	EB2105277010	EB2105277011
Project name/number:	IPCM			Sample Date:	22/02/2021	22/02/2021	23/02/2021	22/02/2021	23/02/2021	23/02/2021	22/02/2021	22/02/2021	23/02/2021	23/02/2021	19/02/2021
			Client sample ID (1st):	SB1	MB1	MB7	MB8B	MB9A	MB9B	MB12	MB14	IPCM GW Duplicate	IPCM GW Field Bla	IPCM Trip Blank	
			Client sample ID (2nd):	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	Groundwater	
			Depth Type:												
			Depth (m):												
			Site:												
			Purchase Order:	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	P1002091	
Analyte grouping/Analyte	CAS Number	Unit	Limit of reporting												
EA005P: pH by PC Titrator															
pH Value		pH Unit	0.01	7.52	7.66	7.48	7.60	7.63	8.06	7.55	8.06	7.45	6.29	----	
EA010P: Conductivity by PC Titrator															
Electrical Conductivity @ 25°C		µS/cm	1	8870	3320	22600	11200	11000	4300	13000	3090	22600	<1	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C															
Total Dissolved Solids @180°C		mg/L	10	6050	1850	16400	7270	7180	2430	8170	1710	15800	<10	----	
EA025: Total Suspended Solids dried at 104 ± 2°C															
Suspended Solids (SS)		mg/L	5	10	<5	<5	15	263	47	11	162	<5	<5	----	
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3	DMO-210-001	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	mg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	mg/L	1	53	507	388	89	88	308	351	445	388	<1	----	
Total Alkalinity as CaCO3		mg/L	1	53	507	388	89	88	308	351	445	388	<1	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA															
Sulfate as SO4 - Turbidimetric	14808-79-8	mg/L	1	134	36	480	2	<1	122	299	120	478	<1	----	
ED045G: Chloride by Discrete Analyser															
Chloride	16887-00-6	mg/L	1	3200	876	8320	4130	4040	1220	4560	790	8320	<1	----	
ED093F: Dissolved Major Cations															
Calcium	7440-70-2	mg/L	1	515	84	554	320	296	73	286	59	551	<1	----	
Magnesium	7439-95-4	mg/L	1	141	107	538	132	147	131	338	137	532	<1	----	
Sodium	7440-23-5	mg/L	1	1100	487	3940	1870	1840	659	2090	418	3910	<1	----	
Potassium	7440-09-7	mg/L	1	21	3	21	15	21	10	24	12	21	<1	----	
EG020F: Dissolved Metals by ICP-MS															
Aluminium	7429-90-5	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	----
Antimony	7440-36-0	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Arsenic	7440-38-2	mg/L	0.001	0.003	0.003	0.001	0.008	<0.001	0.003	0.015	0.006	0.001	<0.001	----	
Barium	7440-39-3	mg/L	0.001	0.203	0.356	0.375	8.38	9.42	0.154	0.552	0.287	0.372	<0.001	----	
Molybdenum	7439-98-7	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.010	0.006	0.002	<0.001	<0.001	----	
Rubidium	7440-17-7	mg/L	0.001	0.034	0.004	0.039	0.024	0.035	0.019	0.036	0.018	0.040	<0.001	----	
Selenium	7782-49-2	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	----	
Silver	7440-22-4	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----	
Strontium	7440-24-6	mg/L	0.001	8.21	2.13	48.8	16.5	14.7	1.65	15.3	1.26	49.7	<0.001	----	
Iron	7439-89-6	mg/L	0.05	0.09	<0.05	0.43	0.44	0.53	<0.05	1.33	<0.05	0.48	<0.05	----	
EG020T: Total Metals by ICP-MS															
Aluminium	7429-90-5	mg/L	0.01	0.03	<0.01	0.05	0.22	3.14	0.92	0.05	0.06	0.06	<0.01	----	
Antimony	7440-36-0	mg/L	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----	
Arsenic	7440-38-2	mg/L	0.001	0.004	0.003	0.001	0.010	0.004	0.003	0.018	0.006	0.002	<0.001	----	
Barium	7440-39-3	mg/L	0.001	0.203	0.366	1.56	8.67	10.1	0.180	0.870	0.322	1.53	<0.001	----	
Molybdenum	7439-98-7	mg/L	0.001	0.002	<0.001	0.005	<0.001	0.001	0.013	0.006	0.001	0.005	<0.001	----	

Selenium	7782-49-2	mg/L	0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	----
Silver	7440-22-4	mg/L	0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	----
Strontium	7440-24-6	mg/L	0.001		8.71	2.33	51.9	17.0	15.8	1.81	16.8	1.35	53.9	<0.001	----
Iron	7439-89-6	mg/L	0.05		0.22	<0.05	0.45	0.74	6.19	1.52	1.57	0.14	0.45	<0.05	----
EG035F: Dissolved Mercury by FIMS															
Mercury	7439-97-6	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	----
EG035T: Total Recoverable Mercury by FIMS															
Mercury	7439-97-6	mg/L	0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	----
EK040P: Fluoride by PC Titrator															
Fluoride	16984-48-8	mg/L	0.1		<0.1	0.5	<0.1	0.2	0.2	0.2	0.2	<0.1	<0.1	<0.1	----
EK067G: Total Phosphorus as P by Discrete Analyser															
Total Phosphorus as P		mg/L	0.01		0.02	<0.01	<0.05	<0.05	0.08	0.10	<0.05	0.03	<0.05	<0.01	----
EN055: Ionic Balance															
Total Anions		meq/L	0.01		94.1	35.6	252	118	116	43.1	142	33.7	252	<0.01	----
Total Cations		meq/L	0.01		85.7	34.2	244	108	107	43.3	134	32.7	242	<0.01	----
Ionic Balance		%	0.01		4.69	1.91	1.73	4.30	3.71	0.27	3.00	1.46	2.13	----	----
EP080/071: Total Petroleum Hydrocarbons															
C6 - C9 Fraction		µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C10 - C14 Fraction		µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	----
C15 - C28 Fraction		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
C29 - C36 Fraction		µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	----
C10 - C36 Fraction (sum)		µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions															
C6 - C10 Fraction	C6_C10	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
>C16 - C34 Fraction		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
>C34 - C40 Fraction		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
>C10 - C40 Fraction (sum)		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	----
EP080: BTEXN															
Benzene	71-43-2	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes		µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX		µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates															
1,2-Dichloroethane-D4	17060-07-0	%	2		106	103	99.8	103	101	99.4	102	103	100	102	101
Toluene-D8	2037-26-5	%	2		95.8	96.3	96.2	96.0	96.2	95.6	95.0	95.2	96.3	94.0	97.3
4-Bromofluorobenzene	460-00-4	%	2		109	109	110	108	109	110	108	110	114	108	110

C15 - C28 Fraction		µg/L	100		<100	<100	<100	<100	700	<100	<100	<100	<100	<100	<100	<100	<100	----
C29 - C36 Fraction		µg/L	50		<50	<50	<50	<50	340	<50	<50	<50	<50	<50	<50	<50	<50	----
C10 - C36 Fraction (sum)		µg/L	50		<50	<50	<50	<50	1040	<50	<50	<50	<50	<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions																		
C6 - C10 Fraction	C6_C10	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction		µg/L	100		<100	<100	<100	<100	300	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction		µg/L	100		<100	<100	<100	<100	710	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction		µg/L	100		<100	<100	<100	<100	150	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)		µg/L	100		<100	<100	<100	<100	1160	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)		µg/L	100		<100	<100	<100	<100	300	<100	<100	<100	<100	<100	<100	<100	<100	<100
EP080: BTEXN																		
Benzene	71-43-2	µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes		µg/L	2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX		µg/L	1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	µg/L	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates																		
1,2-Dichloroethane-D4	17060-07-0	%	2		106	109	104	102	87.9	105	106	108	104	101	104	104	104	102
Toluene-D8	2037-26-5	%	2		100	97.8	101	101	96.8	98.2	102	101	98.7	98.5	101	101	99.6	100
4-Bromofluorobenzene	460-00-4	%	2		104	101	102	102	108	99.3	104	102	101	102	101	101	102	102

ASIA PACIFIC OFFICES

BRISBANE

Level 2, 15 Astor Terrace
Spring Hill QLD 4000
Australia
T: +61 7 3858 4800
F: +61 7 3858 4801

MACKAY

21 River Street
Mackay QLD 4740
Australia
T: +61 7 3181 3300

PERTH

Ground Floor, 503 Murray Street
Perth WA 6000
Australia
T: +61 8 9422 5900
F: +61 8 9422 5901

AUCKLAND

Level 4, 12 O'Connell Street
Auckland 1010
New Zealand
T: 0800 757 695

CANBERRA

GPO 410
Canberra ACT 2600
Australia
T: +61 2 6287 0800
F: +61 2 9427 8200

MELBOURNE

Level 11, 176 Wellington Parade
East Melbourne VIC 3002
Australia
T: +61 3 9249 9400
F: +61 3 9249 9499

SYDNEY

Tenancy 202 Submarine School
Sub Base Platypus
120 High Street
North Sydney NSW 2060
Australia
T: +61 2 9427 8100
F: +61 2 9427 8200

NELSON

6/A Cambridge Street
Richmond, Nelson 7020
New Zealand
T: +64 274 898 628

DARWIN

Unit 5, 21 Parap Road
Parap NT 0820
Australia
T: +61 8 8998 0100
F: +61 8 9370 0101

NEWCASTLE

10 Kings Road
New Lambton NSW 2305
Australia
T: +61 2 4037 3200
F: +61 2 4037 3201

TOWNSVILLE

12 Cannan Street
South Townsville QLD 4810
Australia
T: +61 7 4722 8000
F: +61 7 4722 8001

GOLD COAST

Level 2, 194 Varsity Parade
Varsity Lakes QLD 4227
Australia
M: +61 438 763 516

NEWCASTLE CBD

Suite 2B, 125 Bull Street
Newcastle West NSW 2302
Australia
T: +61 2 4940 0442

WOLLONGONG

Level 1, The Central Building
UoW Innovation Campus
North Wollongong NSW 2500
Australia
T: +61 2 4249 1000