

# EPBC ACT ANNUAL COMPLIANCE REPORT 2020

**Prepared for:**

Stanmore IP Coal Pty Ltd  
GPO Box 2602  
BRISBANE QLD 4001

SLR Ref: 626.30030-R01  
Version No: -v1.0  
May 2021

SLR 

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## 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
626.30030-R01-v1.0	25 May 2021	P. Tett	B. Radloff (SLR)/ B. Parfitt (Stanmore)	P. Tett
626.30030-R01-v0.1	February 2021	P. Tett	B. Radloff	DRAFT

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## 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 Approved Action was officially commenced on the 9<sup>th</sup> of June 2018, and this report is the second report covering the period 9<sup>th</sup> of June 2019 to 8<sup>th</sup> of June 2020.

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 Management Plan (OMP). 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 Potential Offset area

An offset area was identified in the OMP (Base 2018) and included impacted habitat for the Koala (125 ha), Greater Glider (125 ha) and Squatter Pigeon (74 ha).

The OMP included a suitable offset area to compensate for the habitat clearing required for the Isaac Plains East Project. The offset area identified was on Byrne Valley Station near Ayr in North Queensland.

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## EXECUTIVE SUMMARY

The negotiation process for securing this offset was undertaken during the period of this Annual Compliance Report, however negotiations were unsuccessful. Negotiations to secure a new offset at Mt Spencer (approximately 23 km east of Nebo) applicable to the EPBC Approval were in progress at the time of preparing this report. The Department was routinely engaged with on the matter.

## 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 Palins Complex was undertaken by the auditor on the 3<sup>rd</sup> of February 2021, during which interviews and evidence gathering were undertaken. A site inspection of the Isaac Plains East disturbance footprint was also 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 with the exception of Condition 17 for which a non-compliance was found as this Annual Compliance Report was not published within the timeframe required by the condition.

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. Therefore as substantial compliance was achieved a compliant finding is considered appropriate. The Auditor notes that rehabilitation monitoring has been scheduled for June 2021.

Condition 5 - Whilst site condition monitoring of the proposed offset area was not conducted in October 2019 as required under the associated Implementation Plan, this was a function of the unsuccessful negotiation and subsequent loss of access. Therefore, it is considered that Stanmore are compliant with this condition.

It is recommended that Stanmore initiate rehabilitation monitoring annually (including in early 2021) as per the SMP Implementation Plan.

Detailed findings are presented (**Table 2**).

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# 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 3<sup>rd</sup> of February 2021, with evidence gathering and reporting finalised throughout February to May 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 4<sup>th</sup> of January 2017, being Controlled Action Assessment Approach Preliminary Documentation, public notification of the Preliminary Documentation was undertaken on the 19<sup>th</sup> of July 2017. The initial Approval (EPBC 2016/7827) was issued to Stanmore IP Coal Pty Ltd (ABN: 79 606 244 615) on the 28<sup>th</sup> 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 6<sup>th</sup> 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**).

600000

700000

800000

770000

760000

750000

740000



**MACKAY**

**MORANBAH**

**Issac Plains East Project**

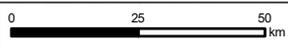
**EMERALD**

**BLACKWATER**

**ROCKHAMPTON**

**LEGEND**

-  Issac Plains East Project
-  Principal Road
-  Secondary Road
-  Railways



Scale: 1:1,500,000 at A4  
 Coordinate System: GDA 1994 MGA Zone 55

Date Drawn: 24-Feb-2021  
 Project Number: 626.30030



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**Project Location**

**FIGURE 1**

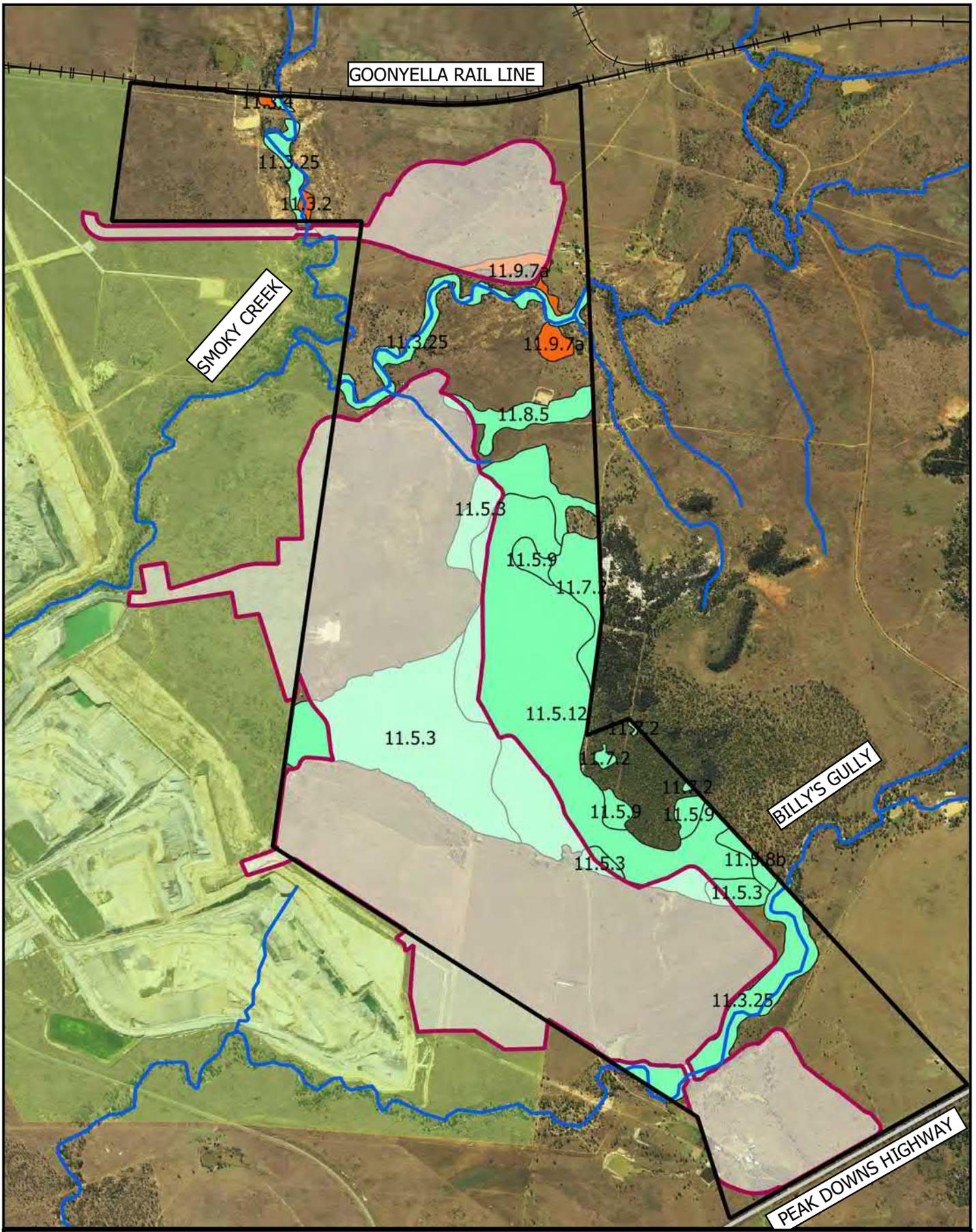


Figure 2: Project Layout and Disturbance Footprint

0 0.75 1.5 km

Legend

- Existing Issac Plains Mine
- Issac Plains East Boundary
- Disturbance Area
- Watercourse

- Road
- Railway
- Remnant Vegetation: Area of Least Concern
- Remnant Vegetation: Area of Concern

Scale @ A3: 1 : 24000  
Date: 21/8/2018  
Drawn: Joshua T



DATA SOURCE  
BASE CONSULTING GROUP 2018; QSPATIAL 2018  
The State of Queensland (Department of Natural Resource and Mines) 2017

**BASE/**

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 9<sup>th</sup> of June 2018, subsequently this report is the second report and covers the period of the 9<sup>th</sup> of June 2019 to the 8<sup>th</sup> of June 2020.

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*), 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 Management Plan (OMP). 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.

## 1.2 Habitat Impacts and Potential Offset area

An offset area was identified in the OMP (Base 2018) and included impacted habitat for the Koala (125 ha), Greater Glider (125 ha) and Squatter Pigeon (74 ha).

The OMP included a suitable offset area to compensate for the habitat clearing required for the Isaac Plains East Project. The offset area identified was on Byrne Valley Station near Ayr in North Queensland, as stated in the OMP:

*“It is the intent of Stanmore to where possible collocate all required offsets within an area of 434 ha within Byrne Valley Station. An 810 ha offset area has been identified as suitable for the offset requirements and the final location of the offset area within the interim 810 ha offset area will be determined during landowner negotiations for legally securing the offset.”*

The negotiation process for securing this offset was undertaken during the period of this Annual Compliance Report, however negotiations were unsuccessful. Negotiations to secure a new offset at Mt Spencer (approximately 23 km east of Nebo) applicable to the EPBC Approval were in progress at the time of preparing this report. Mt Spencer has been nominated as the offset area for the separate Isaac Plains East Extension EPBC Approval (2019-8548) and it is anticipated that this offset would be expanded to address the requirements of the Isaac Plains East approval. The revised OMP for the Isaac Plains East Project would be based on the approved OMP for the Isaac Plains East Extension. The Department was routinely engaged with on the matter. Subsequent to the above, a variation to the Approval (14 August 2020) was granted in order to allow sufficient time for securing the relevant Mt Spencer offset in accordance with Condition 6.

## 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 Species Management Plan and Offset Management Plan Implementation are provided (**Appendix A**).

A site visit to the Isaac Plains Complex was undertaken by the auditor on the 3<sup>rd</sup> of February 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;
- Dave Adams - Golding Technical Services Superintendent; and
- 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 25<sup>th</sup> of May 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 with the exception of Condition 17 for which a non-compliance was found as this Annual Compliance Report was not published within the timeframe required by the condition.

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. Therefore as substantial compliance was achieved a compliant finding is considered appropriate.

Condition 5 - Whilst site condition monitoring of the proposed offset area was not conducted on October 2019 as required under the associated Implementation Plan, this was a function of the unsuccessful negotiation and subsequent loss of access. Therefore, it is considered that Stanmore are compliant with this condition.

It is recommended that Stanmore initiate rehabilitation monitoring annually (including in early 2021) as per the SMP Implementation Plan.

## 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
	<b>Conditions specific to the action</b>		
	<b>Clearance limits</b>		
1	The approval holder must undertake the action within the <b>Isaac Plains East Project Area</b> .	<p>The action has 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.</p> <p>An area of disturbance outside the nominated Approval boundary (Approval Attachment A) was noted. The area was authorised for clearing under site Disturbance Permit #131 (131 C – 05- 07-2109) and accounted for the addressing of the multiple State and Commonwealth Authorities/Approvals. The Queensland Environmental Authority (all versions relevant to the reporting period) permits the area of disturbance in question relating to ML70342 (Isaac Plains) which did not require EPBC Approval. Furthermore the area is included in EPBC 2019-8548 (4<sup>th</sup> of December 2020) Approval (Isaac Plains East Extension) and related offsets were secured.</p>	C

Condition Number	Condition	Findings	Compliance Status
		 <p>(source Google Earth December 2020)</p> <p>Clearing of the area is clearly within all current permitting documents. As such a finding of compliant is considered applicable.</p> <p><i>Evidence:</i> Aerial Imagery (Google Earth as at December 2020) Clearing records, Disturbance Permit #131, Disturbance Permit Register, field inspection, Approval EPBC 2019-8548, EA EPML00932713.</p>	
2	<p>The approval holder must not clear more than:</p> <ol style="list-style-type: none"> <li>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>);</li> <li>74 ha of Squatter Pigeon (Southern) (<i>Geophaps scripta scripta</i>) habitat; and</li> <li>1.4 ha of Ornamental Snake (<i>Denisonia maculata</i>) habitat.</li> </ol>	<p>Mapping of habitat clearing areas within the Approval boundary for each of the listed species was reviewed verified as follows:</p> <ul style="list-style-type: none"> <li>Koala and Greater Glider = 114.9 ha;</li> <li>Squatter Pigeon = 71.4 ha; and</li> <li>Ornamental Snake habitat = 0 ha</li> </ul> <p>Habitat clearing areas remained within the approval constraints. Clearing permits 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><i>Evidence:</i> EPBC Land Clearing email (R. Aspland 2<sup>nd</sup> of February 2021), Disturbance Permits 130, 131, 136 and 145, Disturbance Permit Register and field inspection.</p>	C

Condition Number	Condition	Findings	Compliance Status
	<b>Species Management Plan</b>		
3	<p>The approval holder must submit a Species Management Plan for the written approval of the <b>Minister</b>. The approved Species Management Plan must be implemented. The Species Management Plan must be prepared by a <b>suitably qualified person</b> in accordance with the <b>Department's Environmental Management Plan Guidelines</b> and include:</p> <ul style="list-style-type: none"> <li>a. measures that will be implemented to avoid, mitigate and manage <b>impacts to EPBC Act listed threatened species</b> and their habitat during vegetation <b>clearance</b>, construction, operation and decommissioning of the action;</li> <li>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</li> <li>c. details of how proposed management measures take into account relevant <b>approved conservation advices</b> and are consistent with the measures contained in relevant <b>recovery plans</b> and <b>threat abatement plans</b>.</li> </ul>	<p>A Species Management Plan (SMP) was prepared by BASE Consulting Group (28<sup>th</sup> 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 2<sup>nd</sup> of October 2018). A second letter dated the 21<sup>st</sup> 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 <b>Appendix A</b>, with the exception of the annual rehabilitation monitoring event which was due in early 2020.</p> <p>The SMP was prepared by a suitably qualified person (<i>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.</i>).</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>	C

Condition Number	Condition	Findings	Compliance Status
		<p>The initial version of the SMP approved by the Department remains current.</p> <p><b>Observation:</b></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. Therefore as substantial compliance was achieved a compliant finding is considered appropriate. It is recommended that Stanmore initiate rehabilitation monitoring annually (including in early 2021) as per the SMP Implementation Plan.</p> <p><i>Evidence: SMP, copy of letter dated the 21<sup>st</sup> 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.</i></p>	
4	<p>The approval holder must not <b>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</b> until the Minister has approved the Species Management Plan.</p>	<p>Not applicable to the period of this Annual Compliance Report – Found compliant in the previous Annual Compliance Report.</p> <p><i>Evidence: 21<sup>st</sup> of November 2018 letter from Department to Stanmore Clarifying approval of OMP as at 02 October 2018, Disturbance Permit 99, Disturbance Permit Register.</i></p>	C
	<p><b>Offset Management Plan</b></p>		

Condition Number	Condition	Findings	Compliance Status
5	<p>The approval holder must submit an Offset Management Plan for the written approval of the <b>Minister</b>. The approved Offset Management Plan must be implemented. The Offset Management Plan must be prepared by a <b>suitably qualified person</b> in accordance with the <b>Department's Environmental Management Plan Guidelines</b> and include:</p> <ul style="list-style-type: none"> <li>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.</li> <li>b. details of how the proposed offset/s and Offset Management Plan meet the requirements of the <b>EPBC Act Environmental Offsets Policy</b>;</li> <li>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 <b>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</b>;</li> <li>d. a description and map (including <b>shapefiles</b>) to clearly define the location and boundaries of the proposed offset area/s, accompanied by the <b>offset attributes</b>;</li> <li>e. information about how the proposed offset area/s provide connectivity with other relevant habitats and biodiversity corridors;</li> <li>f. a description of the management measures (including timing, frequency and duration) that will be implemented in each offset area/s;</li> </ul>	<p>The Offset Management Plan (OMP) was prepared by BASE Consulting Group (27<sup>th</sup> of September 2018). The OMP was submitted to the Department for written approval. Written approval for the OMP was given by the Department via letter dated the 2<sup>nd</sup> of October 2018. A second letter dated the 21<sup>st</sup> of November 2018 from the Department relating to the OMP approval was issued correcting errors within the initial letter.</p> <p>The OMP related to the Byrne Valley Station Offset area. The negotiation process for securing this offset was undertaken during the period of this Annual Compliance Report and was ultimately unsuccessful. Subsequently access to the property on which the proposed offset was to be located became unavailable and therefore the two-yearly Site Condition monitoring was not able to be achieved. Offsets to address these requirements are now being pursued at Mt. Spencer (approximately 23 km east of Nebo) as discussed below.</p> <p>The Department was informed of the circumstances.</p> <p>Therefore, Implementation of the OMP as per Table 21 of OMP, (<b>Appendix A</b>) was unable to be achieved and would have provided no value were it to be.</p> <p>The OMP was prepared by a suitably qualified person (<i>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.</i>).</p> <p>The OMP was prepared in accordance with the Department's Environmental Management Plan Guideline.</p> <p>Section 4.3 of the OMP addresses details of the offsets to compensate for MNES species habitat clearing – (a).</p>	C

Condition Number	Condition	Findings	Compliance Status
	<ul style="list-style-type: none"> <li>g. a discussion of how proposed management measures take into account relevant <b>approved conservation advices</b> and are consistent with the measures contained in relevant <b>recovery plans</b> and <b>threat abatement plans</b>;</li> <li>h. completion criteria and performance targets for evaluating the effectiveness of Offset Management Plan implementation, and criteria for triggering corrective actions;</li> <li>i. a program to monitor, report on and review the effectiveness of the Offset Management Plan;</li> <li>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</li> <li>k. details of the mechanism to <b>legally secure</b> the environmental offset/s.</li> </ul>	<p>Section 4.7 of the OMP addresses the requirements of the EPBC Act Environmental Offsets Policy – (b).</p> <p>Section 4.3 and Appendix A of the OMP details the field validation baseline survey for offset areas – (c).</p> <p>Section 4.3 and Figures 3, 4 &amp; 5 of the OMP describe and map proposed offset areas – (d).</p> <p>Section 4.3 of the OMP provides information on habitat connectivity of the proposed offset areas relative to other habitat and corridors – (e).</p> <p>Sections 6.0 and 7.0 of the OMP describe management measures to be implemented in offset areas – (f).</p> <p>Sections 5.0 and 6.0 of the OMP 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 OMP addresses completion criteria and performance targets for evaluating effectiveness of the OMP implementation or triggering corrective actions – (h).</p> <p>Section 7.0 and 8.0 of the OMP discuss monitoring and reporting to review OMP effectiveness – (i).</p> <p>Section 9 of the OMP describes risks to the OMP implementation and contingency measures to mitigate risks – (j).</p> <p>Section 4.6 of the OMP provides details of mechanisms for legally securing offsets – (k).</p>	

Condition Number	Condition	Findings	Compliance Status
		<p>At the time of the site visit it was noted that negotiations to secure a new offset applicable to the EPBC Approval were underway at Mt Spencer. Mt Spencer has been nominated as the offset area for the separate Isaac Plains East Extension EPBC Approval (2019-8548) and it is planned that this offset be expanded to address the requirements of the Isaac Plains East approval. The subsequent OMP would be based on the approved OMP for the Isaac Plains East Extension. The Department has been routinely engaged with on the matter.</p> <p><b>Observation:</b></p> <p>Whilst site condition monitoring of the proposed offset area was not conducted on October 2019 as required under the associated Implementation Plan, this was a function of the unsuccessful negotiation and subsequent loss of access. Therefore, it is considered that Stanmore are compliant with this condition.</p> <p><i>Evidence: OMP, copy of letter dated 21<sup>st</sup> of November 2018 from the Department, CV of Dr Craig Streatfeild (suitably qualified person) who prepared the OMP, Department Environmental Management Plan Guidelines, Offsets Email (Richard Oldham 3<sup>rd</sup> of February 2021).</i></p>	
6	<p>The approval holder must <b>legally secure</b> the environmental offset/s within two (2) years from the <b>commencement</b> of the <b>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.</b></p>	<p>Not applicable to the period of this report. Two years from commencement of clearing (the action) would be the 25<sup>th</sup> of October 2020 (Date of Commencement for Fauna Capture Records - AusEcology).</p> <p><i>Evidence: Fauna Capture records 25<sup>th</sup> of October 2018 to the 17<sup>th</sup> of January 2019.</i></p>	NA

Condition Number	Condition	Findings	Compliance Status
7	The approval holder must not <b>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</b> until the Minister has approved the Offset Management Plan.	Not applicable to the period of this Annual Compliance Report – Found compliant in the previous Annual Compliance Report.  <i>Evidence:</i> 21 <sup>st</sup> of November 2018 letter from Department to Stanmore Clarifying approval of OMP as at 02 October 2018, Disturbance Permit 99, Disturbance Permit Register.	C
	<b>Surface water management</b>		
8	In addition to the surface water quality monitoring requirements of the Environmental Authority issued for the action under the <i>Environmental Protection Act 1994</i> (Qld) (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 <b>commencement</b> of the action.	A water quality monitoring point has been installed at the Isaac River above Smoky Creek. Initial installation and commissioning was completed during April 2018 prior to official commencement of the action (9 <sup>th</sup> 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.  <i>Evidence:</i> Environmental Authority (EA) for the site, Email correspondence 7 <sup>th</sup> of May 2019 from Melanie Ballantine (Stanmore) to Chris Oats (Department Compliance Monitoring Team), Confirmation email from Melanie Ballantine to the Auditor 17 <sup>th</sup> of July 2019, field verification (Photos), maintenance logs (Photos).	C
	<b>Groundwater monitoring and management</b>		
9	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.	The relevant versions of the EA took effect on the 6 <sup>th</sup> of June 2019 and as amended 26 <sup>th</sup> of February 2020.	C

Condition Number	Condition	Findings	Compliance Status
		<p>Condition C42 of the Current EA (C43 of previous version) requires development of a Groundwater Management and Monitoring Program – The site Plan of Operations (which was current for the reporting period states “A <i>Groundwater Management and Monitoring Program was developed in accordance with C42 (C43 of previous version) and provided to DES on the 29 June 2018.</i>”</p> <p>Condition C43 of the current EA (C44 of the previous 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 being finalised by C&amp;R Consulting at the time of completing this report. A summary of the processed data prepared by C&amp;R is included (<b>Appendix C</b>) in this report to satisfy this condition of the Authority.</p> <p>C&amp;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. (<i>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.</i>).</p> <p>Condition C44 of the current EA (C45 of the previous 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 (9<sup>th</sup> October 2019) was sighted and the previous version of the report was published with the 2018/2019 Annual Compliance Report.</p>	

Condition Number	Condition	Findings	Compliance Status
		<p><i>Evidence: Applicable EAs, Raw groundwater data for the Report period (Groundwater Analysis ESDAT export 20210125 bp - April 2019 to Jan 2021.xlsx) sighted correspondence between Stanmore (Belinda Parfitt) and C&amp;R Consulting RE: Annual Groundwater review, October 2019 Annual Groundwater Review, 2020 Annual Groundwater Review (May 2021 – Appendix C).</i></p>	
	<p><b>Riparian zone monitoring</b></p>		
<p>10</p>	<p>Prior to the <b>commencement of mining activities</b>, a <b>suitably qualified person</b> must undertake ecological surveys in accordance with the <b>Department's</b> survey guidelines to determine the extent (in hectares) and <b>habitat condition for EPBC Act listed threatened species</b> in the <b>riparian area</b>. 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 (17<sup>th</sup> to 20<sup>th</sup>) 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, <i>Isaac Plains East Project EPBC Act Baseline Riparian Monitoring</i> – 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 (9<sup>th</sup> of June 2018).</p> <p>The previous (first) Annual Compliance Report found that the ecological survey was completed by a suitably qualified person (<i>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.</i>).</p> <p><i>Evidence: Isaac Plains East Project EPBC Act Baseline Riparian Monitoring</i> – July 2018, first Annual Compliance Report (August 2019).</p>	<p>C</p>

Condition Number	Condition	Findings	Compliance Status
11	For the duration of this approval, the approval holder must maintain the extent and <b>habitat condition</b> for <b>EPBC Act listed threatened species</b> in the <b>riparian area</b> , as determined by the ecological surveys required under condition 10.	<p>The proposed monitoring regime nominated in the <i>Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018</i> will be implemented to monitor habitat condition against the baseline established. The monitoring frequency proposed is every two years, with the first monitoring event to be in late 2020 outside the period of this Annual Compliance Report.</p> <p><i>Evidence: Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018.</i></p>	NA
12	If it is determined that the <b>habitat condition</b> for <b>EPBC Act listed threatened species</b> in the <b>riparian area</b> has not been maintained, the approval holder must notify the <b>Department</b> within one (1) month of determining that the <b>habitat condition</b> has not been maintained.	<p>Not Triggered as monitoring of ongoing habitat condition beyond baseline will not commence until after the period of this Annual Reporting Period, see Condition 11.</p> <p><i>Evidence: Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018.</i></p>	NA
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 <b>Minister</b>. The approved Offset Management Plan must be implemented. The Offset Management Plan must be prepared by a <b>suitably qualified person</b> in accordance with the <b>Department's Environmental Management Plan Guidelines</b> and include:</p> <ul style="list-style-type: none"> <li>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;</li> <li>b. details of how the proposed offset/s and Offset Management Plan meet the requirements of the EPBC Act Environmental Offsets Policy; and</li> </ul>	<p>Not Triggered as Condition 12 has also not been triggered.</p> <p><i>Evidence: Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018.</i></p>	NA

Condition Number	Condition	Findings	Compliance Status
	c. details of the mechanism to legally secure the environmental offset/s.		
14	The approval holder must <b>legally secure</b> the environmental offset/s within two (2) years from the date that the <b>Department</b> was notified in accordance with condition 12.	Not Triggered as Condition 12 has also not been triggered.  <i>Evidence: Isaac Plains East Project EPBC Act Baseline Riparian Monitoring – July 2018.</i>	NA
	<b>Standard administrative conditions</b>		
	<b>Notification of date of commencement of the action</b>		
15	Within 20 days after the <b>commencement</b> of the action, the approval holder must advise the <b>Department</b> in writing of the actual date of <b>commencement</b> .	The commencement date of the action (9 <sup>th</sup> of June 2018) was notified to the Department on the 27 <sup>th</sup> of May 2018.  <i>Evidence : Action commencement notification Email 27 May 2018 from Richard Oldham (Stanmore) to <a href="mailto:postapproval@environmenta.gov.au">postapproval@environmenta.gov.au</a>. and 27 June 2018, letter from the Department to Richard Oldham (Stanmore) acknowledging commencement date.</i>	C
16	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 <b>Department</b> . Such records may be subject to audit by the <b>Department</b> or an independent auditor in accordance with section 458 of the <b>EPBC Act</b> , or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the <b>Department's</b> website. The results of audits may also be publicised through the general media.	Evidence was sighted of commencement correspondence, Disturbance Permits, Spotter catcher and fauna inspection records, OMP and SMP actions ( <b>Appendix A</b> ), water quality records, dust monitoring records.  It is understood that no records were requested by Department officers during the period of this report.	C

Condition Number	Condition	Findings	Compliance Status
		<p><i>Evidence: Action commencement notification, Disturbance Permits, Offset Management Plan and Species Management Plan implementation records, water monitoring site visit (Isaac River) records, machinery inspection records, dust monitoring records, nest box inspection records, Spotter Catcher Letter Report (EcoSM 2020).</i></p>	
17	<p>Within three (3) months of every 12 month anniversary of the <b>commencement</b> 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 <b>Department</b> 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 <b>Minister</b>.</p>	<p>This report was prepared and will be published outside the timeframe applicable to this condition and subsequently non-compliance was found on this basis.</p> <p>Notification will be provided to the Department confirming upload of this report to Stanmore Website.</p> <p>The previous (inaugural) Annual Compliance Report was located on the Stanmore Web Site (<a href="https://stanmorecoal.com.au/environment-management">https://stanmorecoal.com.au/environment-management</a>) and dated 15 August 2019 within the three month requirement (9<sup>th</sup> of September 2019). Email notification of publication to the Department on 15<sup>th</sup> of August 2019 was evidenced.</p> <p><i>Evidence: 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 Publishing.</i></p>	NC (Pending)

Condition Number	Condition	Findings	Compliance Status
18	The approval holder must report any potential or actual contravention of the conditions of this approval to the <b>Department</b> in writing within five (5) business days of the approval holder becoming aware of a contravention.	<p>To date contravention of conditions has been limited to non-compliance with the reporting timeframe of Condition 17. On becoming aware that the reporting date had passed Stanmore contacted SLR on the 9<sup>th</sup> of December 2020 to request a proposal to prepare the Annual Compliance Report for the subject period. Further to this request for proposal Stanmore provided written notice (Email) to the Department on the 11<sup>th</sup> of December 2020, within five business days becoming aware of not complying with Condition 17. The notification to the Department included a commitment to the Annual Compliance Report for the period of the 9<sup>th</sup> of June 2019 to the 8<sup>th</sup> of June 2020 (this Report).</p> <p><i>Evidence:</i> Email (11<sup>th</sup> of December 2020) from Paul Tett (SLR) to Belinda Parfitt (Stanmore) providing Annual Compliance Report Proposal, Email (11<sup>th</sup> of December 2020 from Leandro Pires (Stanmore) to the Department (<a href="mailto:EPBCMonitoring@environment.gov.au">EPBCMonitoring@environment.gov.au</a>) and subsequent acknowledgement reply email from the Department, this Report.</p>	C
19	Upon the direction of the <b>Minister</b> , the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the <b>Minister</b> . The approval holder must not commence the audit until the <b>Minister</b> approves the independent auditor and audit criteria in writing. The audit report must address the criteria to the satisfaction of the <b>Minister</b> .	<p>No such direction has been received from the Minister.</p> <p><i>Evidence:</i> Verbal (Belinda Parfitt).</p>	NA
20	The approval holder may choose to revise a management plan approved by the <b>Minister</b> under condition 3 without submitting it for approval under section 143A of the <b>EPBC Act</b> , if the taking of the action in accordance with the revised plan would not be likely to have a <b>new or increased impact</b> . If the approval holder makes this choice it must:	<p>Not Triggered as the SMP and OMP have not been revised since approval by the Department on the 2<sup>nd</sup> of October 2018.</p> <p><i>Evidence:</i> SMP, OMP, copy of the letter dated 21<sup>st</sup> of November 2018 from the Department, Verbal (Belinda Parfitt).</p>	NA

Condition Number	Condition	Findings	Compliance Status
	<p>a. notify the <b>Department</b> in writing that the approved plan has been revised and provide the <b>Department</b>, at least four (4) weeks before implementing the revised plan, with:</p> <ul style="list-style-type: none"> <li>i. an electronic copy of the revised plan;</li> <li>ii. an explanation of the differences between the revised plan and the approved plan; and</li> <li>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 <b>new or increased impact</b>.</li> </ul>		
20A	<p>The approval holder may revoke its choice under condition 20 at any time by notice to the <b>Department</b>. If the approval holder revokes the choice to implement a revised plan, without approval under section 143A of the <b>EPBC Act</b>, the plan approved by the <b>Minister</b> must be implemented.</p>	<p>Not Triggered as Condition 20 has also not been triggered.</p> <p><i>Evidence: SMP, OMP, copy of the letter dated 21<sup>st</sup> of November 2018 from the Department, Verbal (Belinda Parfitt).</i></p>	NA
20B	<p>If the <b>Minister</b> gives a notice to the approval holder that the <b>Minister</b> is satisfied that the taking of the action in accordance with the revised plan would be likely to have a <b>new or increased impact</b>, then:</p> <ul style="list-style-type: none"> <li>a. condition 20 does not apply, or ceases to apply, in relation to the revised plan; and</li> <li>b. the approval holder must implement the plan approved by the Minister.</li> </ul> <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 <b>Minister</b> 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>Not Triggered as Condition 20 has also not been triggered.</p> <p><i>Evidence: SMP, OMP, copy of the letter dated 21<sup>st</sup> of November 2018 from the Department, Verbal (Belinda Parfitt).</i></p>	NA
20C	<p>Conditions 20, 20A and 20B are not intended to limit the operation of section 143A of the <b>EPBC Act</b> which allows the approval holder to submit a revised plan to the <b>Minister</b> for approval.</p>	<p>Not Triggered as the SMP and OMP have not been revised since approval by the Department on the 2<sup>nd</sup> of October 2018.</p>	NA

Condition Number	Condition	Findings	Compliance Status
		<i>Evidence: SMP, OMP, copy of the letter dated 21<sup>st</sup> of November 2018 from the Department. Verbal (Belinda Parfitt)</i>	
21	If, at any time after five (5) years from the date of this approval, the approval holder has not <b>commenced</b> the action, then the approval holder must not <b>commence</b> the action without the written agreement of the <b>Minister</b> .	<p>Not Triggered as the action has commenced and is within 5 years of the date of approval.</p> <p><i>Evidence: The Approval and action commencement notification Email 27<sup>th</sup> of May 2018 from Richard Oldham (Stanmore) to <a href="mailto:postapproval@environmenta.gov.au">postapproval@environmenta.gov.au</a>. and 27<sup>th</sup> of June 2018, letter from the Department to Richard Oldham (Stanmore) acknowledging commencement date.</i></p>	NA
22	Unless otherwise agreed to in writing by the <b>Minister</b> , 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 <b>Minister</b> 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 <b>Minister</b> .	<p>The SMP and OMP have been published on the Stanmore website (<a href="https://stanmorecoal.com.au/environment-management">https://stanmorecoal.com.au/environment-management</a>), and the link dated 28<sup>th</sup> of September 2018. Checked as at the 1<sup>st</sup> and 18<sup>th</sup> of February 2021.</p> <p>The SMP and OMP were approved outside the period of this Annual Compliance Report.</p> <p><i>Evidence: Stanmore website (accessed 1<sup>st</sup> and 18<sup>th</sup> of February 2021).</i></p>	C

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## 5 Reviewed Documentation

ALS Hydrographics, 31<sup>st</sup> of March 2020. *DATA SUMMARY REPORT: January 2020*. (Water, Air and Groundwater).

AusEcology, 22<sup>nd</sup> of November 2018. *Nestbox Installation at ML70018 November 2018*. Nest Box Location Plan - 14 nest boxes.

AusEcology, March 2019. *Fauna Capture records 9<sup>th</sup> of March 2019 to the 17<sup>th</sup> of March 2019*.

Australian Government Department of Environment and Energy (Department), 21<sup>st</sup> of November 2018. Letter RE: *Offset Management Plan and Species Management Plan, Extension to Isaac Plain Mine, Moranbah, Qld (EPBC 2016/7827)*. Letter corrects errors in preceding letter from the Department of the 2<sup>nd</sup> of October 2018.

Australian Government Department of Environment and Energy (Department), 23<sup>rd</sup> of May 2019. Letter RE: *Compliance Monitoring Inspection Isaac Plains Coal Mine (EPBC 2016/7827)*. Letter acknowledges compliance with Conditions 1, 2, 3 and 4.

Australian Government Department of Environment and Energy (Department), 27<sup>th</sup> of June 2018. Letter RE: *Commencement of the Action, Extension to the existing Isaac Plains Mine, QLD, EPBC 2016/7827*. Letter acknowledges action commencement notification (9<sup>th</sup> of June 2018).

Australian Government Department of Environment, 2014. *Environmental Management Plan Guidelines, Commonwealth of Australia 2014*. <https://www.environment.gov.au/system/files/resources/21b0925f-ea74-4b9e-942e-a097391a77fd/files/environmental-management-plan-guidelines.pdf>

BASE Consulting Group, 28<sup>th</sup> of September 2018. *Isaac Plains East – Matters of National Environmental Significance Fauna Species Management Plan*. [https://stanmorecoal.com.au/sites/default/files/2018-12/2016-7827-Species%20Management%20Plan%20Rev%205-Finalv2\\_reduced%20size\\_opt.pdf](https://stanmorecoal.com.au/sites/default/files/2018-12/2016-7827-Species%20Management%20Plan%20Rev%205-Finalv2_reduced%20size_opt.pdf).

BASE Consulting Group, Undated. *Dr Craig Streatfeild, Principal Environmental Scientist – Curriculum Vitae*.

C&R Consulting, 9<sup>th</sup> of October 2019. *Isaac Plains Complex 2019 Annual Groundwater Review*.

C&R Consulting, 21<sup>st</sup> of May 2021. *Isaac Plains Complex 2020 Annual Groundwater Review*. (**Appendix C**).

C&R Consulting, January 2019. *Isaac Plains Coal Mine Rehabilitation Inspection 2019*.

C&R Consulting, June 2018. *Isaac Plains Complex Rehabilitation Monitoring Program*.

Department of Environment and Science (DES), 26<sup>th</sup> of February 2020. *Environmental Authority EPML00932713 Isaac Plains Mine*.

Department of Environment and Science (DES), 6<sup>th</sup> of June 2019. *Environmental authority EPML00932713*.

Ecological Survey and Management, 8<sup>th</sup> of April 2020 (EcoSM 2020)– Letter RE: *Fauna Spotter Catcher Works Isaac Plains*.

Ecological Survey and Management, July 2018. *Isaac Plains East Project EPBC Act Baseline Riparian Monitoring*.

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Emails – Belinda Parfitt (Stanmore) to C&R Consulting (Multiple) - *Subject Regarding 2020 Annual Groundwater Monitoring Report.*

Email – Belinda Parfitt (Stanmore) to Darren King (Stanmore) et.al. (Stanmore & Golding), 6<sup>th</sup> of April 2020. *FW: Site Information Brief: Clearing at IPE Pit 2 - CLEARING COMPLETE + EGGS.*

Email – Belinda Parfitt (Stanmore) to Paul Tett (SLR), 1<sup>st</sup> of February 2021. *RE: RFI for Audit and Proposed Site Visit.*

Email – Belinda Parfitt (Stanmore) to Paul Tett (SLR), 14<sup>th</sup> of May 2021. *RE: IPCM | Confirmation no Greater Gliders found when clearing vegetation.*

Email – Ben Cuff (C&R Consulting) to Belinda Parfitt (Stanmore), 1<sup>st</sup> of May 2021. *RE: IPCM - Annual Rehab Monitoring Inspection.*

Email – Bernie O’Neill (Stanmore) to Chris Oates (Department), 15<sup>th</sup> of August 2019. *Stanmore Coal - Isaac Plains Mine - 2019 Annual Compliance Report.*

Email – Paul Kerr (Golding) to Belinda Parfitt (Stanmore), 7<sup>th</sup> of April 2020. *Emailing: 200407\_IPE2\_PIGEON NEST.csv.*

Email – Richard Oldham (Stanmore) to Belinda Parfitt (Stanmore), 3<sup>rd</sup> of February 2021. *Offsets.*

Email – Russell Aspland (Minserve) to Belinda Parfitt (Stanmore), 2<sup>nd</sup> of February 2021. *EPBC land clearing.*

Email (chain) – Michael O’Connor (Ecological Survey and Management) to Belinda Parfitt, 07 to 09 April 2020. *Possum Island Nest Box Inspection.*

Golding, 15<sup>th</sup> of December 2020 example of recent Mine Design Assessment.

Golding, 17<sup>th</sup> of July 2019 IPSHMS Heavy Vehicle Compliance Checklist.

Richard Oldham 27<sup>th</sup> of June 2018. *Email to [postapproval@environment.gov.au](mailto:postapproval@environment.gov.au) (Cc’ed x 3) Subject: Commencement Date - Isaac Plains Mine, Queensland (EPBC 2016/7827).*

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Stanmore IP Coal Pty Ltd, *Site mapping files (multiple) delineating limits of disturbance and showing the approved project boundary.* Sighted during site visit on the 3<sup>rd</sup> of February 2021.

Stanmore IP Coal Pty Ltd, 1<sup>st</sup> of February 2019. *Plan of Operations - Isaac Plains Complex ML 70342, ML 700016, ML 700017, ML 700018, ML 700019 - Plan Period: 01 February 2019 to 31 December 2020. Including topsoil inventory (Appendix C) and 2020 Disturbance Plan).*

Stanmore IP Coal Pty Ltd, 16<sup>th</sup> of July 2020 (most recent entry). *FAUNA REGISTER 2016-20 for Isaac Plains Coal Mine.*

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Stanmore IP Coal Pty Ltd, 23<sup>rd</sup> of July 2020. *Site Environmental Brief - Threatened Animals Species at Isaac Plains.*

Stanmore IP Coal Pty Ltd, 26<sup>th</sup> of August 2019. Disturbance Permit: 136 (29.6 hectares). Incl. associated plans.

Stanmore IP Coal Pty Ltd, 27<sup>th</sup> of March 2020. *Site Environmental Brief - Isaac Plains East (IPE) – Pit 2 Paddock Vegetation Clearing.*

Stanmore IP Coal Pty Ltd, 28<sup>th</sup> of June 2019. Disturbance Permit: 130 (15.7 hectares). Incl. associated plans.

Stanmore IP Coal Pty Ltd, 28<sup>th</sup> of June 2019. Disturbance Permit: 131 (64 hectares). Incl. associated plans.

Stanmore IP Coal Pty Ltd, 30<sup>th</sup> of April 2018. *Retention of Infrastructure Post Mine Life agreement Letter and Map (signed by Stanmore and background landholder 30<sup>th</sup> of April 2018.*

Stanmore IP Coal Pty Ltd, 4<sup>th</sup> of February 2020. *Site Environmental Brief – Permits to Disturb.*

Stanmore IP Coal Pty Ltd, 4<sup>th</sup> of November 2020. *Site Environmental Brief - Introduction of Environmental Green Guidelines.*

Stanmore IP Coal Pty Ltd, 4<sup>th</sup> of October 2018. *Disturbance Permit 145 (77.86 hectares).* Incl. associated plans.

Stanmore IP Coal Pty Ltd, 4<sup>th</sup> of October 2018. *Disturbance Permit 99 (77.86 hectares).* Incl. associated plans.

Stanmore IP Coal Pty Ltd, 5<sup>th</sup> of May 2020. *Isaac Plains Coal Mine Dust Management Review Dust Management Review Stanmore Coal*

Stanmore IP Coal Pty Ltd, 9<sup>th</sup> of March 2020. Disturbance Permit: 145 (0.32 hectares). Incl. associated plans.

Stanmore IP Coal Pty Ltd, *Isaac Plains Disturbance Permit Register – Site Environmental Management System Document (viewed 3<sup>rd</sup> of February 2021).*

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WRM Water and Environment Pty Ltd, 13<sup>th</sup> of May 2019. *Isaac Plains Complex Water Management Plan Review 2019.*

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# 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 February 2021 (Evidence)
Limit or avoid loss of MNES and/or habitat for MNES.	<ul style="list-style-type: none"> <li>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.</li> <li>No net loss of habitat for the Koala and Greater Glider outside of the approved disturbance limits.</li> <li>No loss of permanent water sources for the Squatter Pigeon outside of the approved disturbance limits.</li> <li>Rehabilitation of disturbed areas will be rehabilitated in accordance with the Project's Rehabilitation Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure will be sited in accordance with the State and Commonwealth approval conditions.</li> <li>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.</li> <li>Where exclusion fencing is required, consideration shall be given to fauna movement, current land uses and worker safety requirements.</li> <li>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</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>Temporary stockpile sites for soil and equipment, access routes, laydown areas and other associated infrastructure will be located in cleared areas and will not be situated in areas of MNES habitat.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>No disturbance to permanent water sources, which may provide habitat for Squatter Pigeons and Ornamental Snakes, outside of the disturbance areas.</li> <li>Rehabilitation and decommissioning fails to meet the objectives of the Rehabilitation Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Fauna Spotter will monitor and record clearing activities and all fauna encountered.</li> <li>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.</li> <li>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.</li> <li>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).</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>The Plan will include a schedule to implement the corrective actions.</li> <li>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.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>The Corrective Actions identified in the Corrective Action Contingency Plan and approved by DotEE will be implemented and may include additional rehabilitation or offsets or provision of additional permanent water sources</li> </ul>	<ul style="list-style-type: none"> <li>Infrastructure as per approvals. (<i>Field observations</i>).</li> <li>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. (<i>BP, Register Sighted on site</i>).</li> <li>Requirements SMP and OMP addressed in the Permits to Disturb. (<i>Permits to Disturb, Disturbance Permit Register</i>).</li> <li>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. (<i>BP, Field, Survey Records</i>).</li> <li>GIS files prepared and viewed. Limit of disturbance clearly delineated. (<i>Field, Golding Mine Plans</i>).</li> <li>Limit of disturbance shown on Operational Drawings, dams defined in Water Management Plan. (<i>Operational Drawings, Permits to Disturb, Water Management Plan and Review 2019</i>).</li> <li>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 go areas and clearing limits. (<i>Field, Disturbance Permits</i>)</li> <li>Water infrastructure retention agreement and plan in place. (<i>Retention of Infrastructure Agreement</i>).</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
		<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• The pre-clearance survey will be undertaken in order to: <ul style="list-style-type: none"> <li>• 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</li> <li>• Relocate all captured non-breeding animals to suitable habitat adjacent to the disturbance area and within the Project Area.</li> </ul> </li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> <li>• 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 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.</li> </ul>			<p>for the Squatter Pigeon and/or Ornamental Snake prey.</p> <ul style="list-style-type: none"> <li>• 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.</li> </ul>	<ul style="list-style-type: none"> <li>• Timing of disturbance was generally outside breeding (Mid Dry to Wet) season for Squatter Pigeon. (<i>Disturbance Permits, Disturbance Permit Register</i>).</li> <li>• 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. (<i>HSEC Training Package, Information Posters, Green Guidelines Signs, Site Environmental Briefs</i>).</li> <li>• Permit to disturb system in use. (<i>Disturbance Permits, Disturbance Permit Register</i>).</li> <li>• 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. (<i>EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing</i>).</li> <li>• Stockpiles are located outside of MNES habitat areas. (<i>Disturbance Permits, Field</i>).</li> <li>• The maximum site speed limit is 60 km\hr and signage is located throughout the site. (<i>Field</i>).</li> <li>• Pre clearance surveys undertaken by qualified ecologist (EcoSM) prior to and concurrent with clearing. During March and April 2020 EcoSM Ecologist attended site to undertake the pre-clearing survey. (<i>EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Disturbance Permits</i>).</li> <li>• Hollow bearing tree locations, log piles and nests were recorded. (<i>Appendix A of EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March /</i></li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
		<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>				<p><i>April 2020 clearing, Fauna Capture Records).</i></p> <ul style="list-style-type: none"> <li>Animals were captured and relocated (and recorded) as required by Spotter catchers during clearing activities. <i>(Interview of Ecologist on site to undertake the pre-clearing and spotter catching for the 17 July 2019 clearing campaign, Fauna Capture Records).</i></li> <li>Spotter catchers undertook pre and post-clearing inspections. <i>(EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Fauna Capture Records).</i></li> <li>Injured wildlife was directed to carers as required and record noted in Fauna Register records (E.G. Kangaroo 13/03/20). <i>(Fauna Register Records).</i></li> <li>Records show progressive clearing away from undisturbed habitat where possible. <i>(Disturbance Permits, EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Fauna Capture Records, Field).</i></li> <li>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. <i>(Disturbance Permits, EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Fauna Capture Records, Field).</i></li> <li>A tree grab was contracted to site as required for clearing campaigns to manage hollow bearing trees. <i>(BP, EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing).</i></li> <li>Fauna was relocated a minimum of 200 m away from clearing activities and locations recorded in the Fauna Capture Records. <i>(EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Fauna Capture Records).</i></li> <li>An active Squatter Pigeon nest was identified in the March / April 2020 pre-clearing survey. The Recommendations</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
						<p>of the subsequent report were enacted, including, delaying clearing of the nest tree and within an exclusion zone. (EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing, Fauna Capture Records, Email IPE2 PIGEON NEST_csv, Email Site Information Brief: Clearing at IPE Pit 2 - CLEARING COMPLETE + EGGS, Photos of Squatter Pigeon nest tree demarcation x 5 [(a) to (e)]).</p> <ul style="list-style-type: none"> <li>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&amp;R June 2018) and Rehabilitation Management Plan (Stanmore September 2019) reference Condition F13 of the EA and indicate annual monitoring will take place. The most recent monitoring inspection was undertaken in January 2019 (C&amp;R January 2019). No Rehabilitation Inspection was undertaken during the reporting period. The Auditor notes that rehabilitation monitoring has been scheduled for June 2021 (Email - C&amp;R Consulting).</li> </ul>
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"> <li>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.</li> <li>Site access is only to occur along designated site access tracks. No unauthorised access is permitted.</li> <li>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.</li> <li>Posters will be developed and displayed in meeting areas that reminds staff and contractors about the MNES present in the Project area.</li> <li>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 adjacent to threatened fauna habitat. All staff and contractors</li> </ul>	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"> <li>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 Appendix A and Appendix B.</li> </ul>	<ul style="list-style-type: none"> <li>Where inadvertent disturbance to MNES habitat occurs, an investigation will be undertaken.</li> <li>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 DotEE will be notified within 20 business days of</li> </ul>	<ul style="list-style-type: none"> <li>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).</li> <li>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).</li> <li>The maximum site speed limit is 60 km\hr and signage is located throughout the site. (Field).</li> <li>Information Sheets / Posters are routinely located in common gathering areas, including office areas. These posters are specifically distributed as clearing campaigns are initiated. Custom bench seats have been</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
		<p>will be required to report sightings of MNES fauna to the EO immediately</p> <ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> <li>Implementation of dust suppression techniques in accordance with the Dust Management Plan and the CMSHA and the CMSHR.</li> <li>Maintenance of existing fences.</li> <li>Pest animals and weeds will be managed in accordance with the Project's Weed and Pest Management Plan.</li> <li>Light spill we be directed to the open cut pits to minimise light spill.</li> <li>The use of low wattage lighting with list spill guards.</li> </ul>			<p>the decline in habitat quality.</p> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>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"> <li>Rehabilitation of MNES habitat.</li> <li>Additional environmental awareness training to workers regarding MNES.</li> <li>Increasing pest animal and weed control measures or revising the type of measures implemented.</li> <li>Increasing the frequency of dust suppression techniques.</li> <li>Repair fences if damaged, or installation of new fencing.</li> </ul> </li> <li>Provision of additional offsets in accordance with the EPBC Act approval Condition 13.</li> </ul>	<p>constructed showing the MNES Species and are distributed around the administration and shift change bus stop areas (<i>Information Posters, Green Guidelines Signs, Site Environmental Briefs</i>).</p> <ul style="list-style-type: none"> <li>The HSEC Training Package includes MNES considerations and injured fauna reporting. (<i>HSEC Training Package</i>).</li> <li>To date no hollow trees associated with Greater Gliders have been recorded. (<i>BP, Fauna Capture Records, Email - B Parfitt</i>).</li> <li>Logs and hollows with habitat value have previously been salvaged during clearing campaigns. (<i>Field</i>).</li> <li>14 nest boxes have been installed in undisturbed habitat. (<i>Field, AusEcology 2018</i>).</li> <li>Nest Box inspection was undertaken by a qualified ecologist during the reporting period (<i>Email - Michael O'Connor to Belinda Parfitt</i>).</li> <li>Standard operating procedures require dust management in accordance with Dust management Plan and Health and Safety Legislation. (<i>Dust Management Plan</i>).</li> <li>Fences are maintained in good order and the lower strand is located at approximately 600 mm above the ground to enhance fauna movement. (<i>Field</i>).</li> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (<i>BP</i>).</li> <li>Light is directed towards operations which is generally away from undisturbed areas. (<i>Lighting plants field</i>).</li> </ul>
Minimise risk of weed introduction	<ul style="list-style-type: none"> <li>No new weed species are established in areas</li> </ul>	<ul style="list-style-type: none"> <li>Weeds will be managed in accordance with the Project's Weed and Pest Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>An increase in the average percent (%) cover score of weed species from</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of weeds outside of the disturbance areas will be undertaken</li> </ul>	<ul style="list-style-type: none"> <li>Should an increase in weed cover or presence of new weed species be</li> </ul>	<ul style="list-style-type: none"> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
and/or the spread of existing weed species in habitat area for MNES.	<ul style="list-style-type: none"> <li>of MNES habitat based on baseline data.</li> <li>Spreading of weeds does not occur relative to baseline data.</li> </ul>	<ul style="list-style-type: none"> <li>The Plan will include the following: <ul style="list-style-type: none"> <li>A site induction program that provides weed management information to staff, contractors and visitors.</li> <li>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 <i>Biosecurity Act 2014</i>.</li> <li>Weed washdown procedures for all vehicles brought to site that will be traveling beyond the site office carpark.</li> <li>Targeted weed control measures within the Project area.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>baseline and/or previous monitoring events.</li> <li>Detection of weed species not previously recorded in the Project area during baseline and/or previous monitoring events.</li> </ul>	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"> <li>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.</li> <li>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.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected.</li> <li>Potential corrective actions may include: <ul style="list-style-type: none"> <li>Increasing the frequency and/or duration of weed control efforts.</li> <li>Investigating and/or implementing alternate weed management control actions.</li> <li>Amending weed hygiene practices.</li> <li>Updating the Weed and Pest Management Plan.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>site inspections. Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (BP).</li> <li>The HSEC Training Package includes weed and pest management. (HSEC Training Package).</li> <li>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, <i>Field (Washbay Inspection)</i>).</li> <li>Weed treatment is undertaken as determined by site inspections and rehabilitation monitoring. (BP).</li> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. (BP).</li> </ul>
Reduce habitat degradation and potential predation on	<ul style="list-style-type: none"> <li>No new pest animal species are established in areas</li> </ul>	<ul style="list-style-type: none"> <li>Pest animals will be managed in accordance with the Project's Weed and Pest Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>Observed increase in sightings/signs and/or the relative abundance of pest</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring of pest animals in the retained MNES habitat will be undertaken</li> </ul>	<ul style="list-style-type: none"> <li>Should evidence of pest animals show an increase compared to baseline,</li> </ul>	<ul style="list-style-type: none"> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
<p>MNES by pest animals.</p>	<p>of MNES habitat in comparison to baseline data.</p> <ul style="list-style-type: none"> <li>Reduction in pest animal numbers in areas of habitat for MNES to below baseline levels.</li> </ul>	<ul style="list-style-type: none"> <li>The Project's Weed and Pest Management Plan includes requirements for: <ul style="list-style-type: none"> <li>Appropriate waste management and waste disposal.</li> <li>A reporting framework to ensure sightings of pest animals are recorded.</li> <li>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.</li> <li>Control of pest animals.</li> </ul> </li> <li>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).</li> <li>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 <i>Biosecurity Act 2014</i> and as permitted under the SHMS.</li> </ul>	<p>animals in areas of retained MNES habitat above baseline levels.</p> <ul style="list-style-type: none"> <li>Direct observation or signs of, a pest animal not identified as occurring within the Project area during the baseline surveys.</li> </ul>	<p>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)).</p> <ul style="list-style-type: none"> <li>Potential predation of MNES will also be assessed during the habitat quality scoring assessment and the riparian monitoring program (Appendix D) outlined above.</li> </ul>	<p>undertake an investigation to assess possible reasons for the increase (e.g. inappropriate waste management leading to increased pest animals).</p> <ul style="list-style-type: none"> <li>Should predation of MNES be observed undertake an investigation to assess possible reasons for the incident(s).</li> <li>Review adherence to the Project's Weed and Pest Management Plan.</li> <li>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.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected.</li> <li>Potential corrective actions may include: <ul style="list-style-type: none"> <li>Increasing the frequency and/or duration of pest animal control efforts.</li> <li>Investigating and/or implementing alternate pest animal control methods in consultation with DAF.</li> <li>Updating the Weed and Pest Management Plan to include new species where relevant.</li> </ul> </li> </ul>	<p>site inspections Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (BP).</p> <ul style="list-style-type: none"> <li>The Environment and Community - Training Induction Package includes weed and pest management. (<i>Induction Training Package</i>).</li> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (BP).</li> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (BP).</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
Minimise impacts of dust deposition on habitat for MNES during construction and operation of the Project.	<ul style="list-style-type: none"> <li>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.</li> <li>Dust is monitored in accordance with the Dust Management Plan which must be developed in accordance with Condition B5 of the Project's EA.</li> </ul>	<ul style="list-style-type: none"> <li>Dust suppression will be undertaken in accordance with the Dust Management Plan and include the following actions: <ul style="list-style-type: none"> <li>Staging vegetation clearing to minimise areas of disturbed and bare ground.</li> <li>Progressively rehabilitating disturbed areas.</li> <li>Removal and dumping of overburden as soon as reasonably practical following blasting activities</li> <li>Regular watering of haul roads and access tracks in accordance with the CMSHR.</li> <li>Dust suppression spraying of stockpiles.</li> <li>Limiting grading and/or dozing in high dust generating areas.</li> <li>Limiting overburden drilling.</li> <li>Enforcing speed limits in accordance with the requirements of the CMSHA and CMSHR.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Dust deposition levels exceed 120 mg per square metre per day when averaged over one month at sensitive receptors.</li> <li>Visual inspections of vegetation adjacent to the disturbance areas show visible signs of dust deposition.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Existing monitoring includes visual inspections of vegetation adjacent to the disturbance areas.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Should an exceedance of dust deposition levels be attributed to Project activities Stanmore will implement dust abatement measures.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified in the Dust Management plan will be implemented within 10 days of the trigger being detected.</li> </ul>	<ul style="list-style-type: none"> <li>Standard operating procedures require dust management in accordance with Dust management Plan and Health and Safety Legislation. (<i>Dust Management Plan</i>).</li> <li>Vegetation Clearing is conducted progressively to minimise bare areas. (<i>Field, Disturbance Permits, Disturbance Permit Register</i>).</li> <li>Rehabilitation is undertaken progressively in accordance with legislative requirements. (<i>Field</i>).</li> <li>Blasting and overburden removal are consecutive components of the mining process. (<i>Field</i>).</li> <li>Overburden drilling is undertaken only as required and free dig operations were observed during the site visit. (<i>Field</i>).</li> <li>The maximum site speed limit is 60 km\hr and signage is located throughout the site. (<i>Field</i>).</li> <li>Dust monitoring is undertaken. (<i>Field</i>).</li> </ul>
Minimise noise and vibration impacts in areas of MNES habitat.	When measured, noise and vibration levels do not exceed criteria set out in Tables 15 and 16 of the Project EA at sensitive receptors.	<ul style="list-style-type: none"> <li>Regularly maintaining and servicing all plant equipment to minimise machinery noise.</li> <li>All engine covers will be kept closed while equipment is operating.</li> <li>Blasting will only occur between 9am and 7pm.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>When blasting occurs outside of the approved blast times.</li> </ul>	<ul style="list-style-type: none"> <li>Noise and vibration monitoring will be undertaken in accordance with monitoring Conditions outlined in Section D of the Project's EA.</li> </ul>	<ul style="list-style-type: none"> <li>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 the administering authority within seven days of the exceedance occurring.</li> <li>Should exceedance levels be attributed to mining activities, noise and vibration abatement measures will be implemented.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified during investigations will be implemented within 10</li> </ul>	<ul style="list-style-type: none"> <li>Machinery is maintained and operated appropriately, no uncharacteristically noisy plant was noted during the site visit. (<i>Field</i>).</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
					days of the trigger being detected.	
Minimise degradation of habitat for MNES from an increased risk of fire due resulting from Project activities.	No uncontrolled fires within the Project area resulting from Project related activities.	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>Buffers will be maintained around potential ignition sources such as plant and machinery, haul roads and mine infrastructure areas.</li> <li>Prior to site entry, all relevant site personnel, including contractors, will be made aware of fire safety and risks.</li> <li>Fuel loads will be minimised and managed through the weed control measures outlined in the Weed and Pest Management Plan.</li> </ul>	<ul style="list-style-type: none"> <li>An uncontrolled fire occurs within the Project area that is due to mining activities.</li> <li>Weed cover exceeds baseline levels and groundcover biomass (e.g. vegetation) exceeds benchmark levels.</li> </ul>	<ul style="list-style-type: none"> <li>Compliance with the SHMS will be monitored in accordance with the requirements of the CMSHA and CMSHR.</li> <li>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)).</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul> <p><b>Corrective Actions:</b> Any corrective actions identified will be implemented within 30 days of the trigger being detected.</p>	<ul style="list-style-type: none"> <li>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'. (BP)</li> <li>Weeds and Pests are managed according to the findings of rehabilitation monitoring and or routine site inspections. Weeds and Pests are managed according to the findings of rehabilitation monitoring, Weed and Pest Management Plan, and/or routine site inspections. This has included baiting for dogs and pigs and extensive spraying for Bellyache Bush. (BP).</li> </ul>
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"> <li>Water quality does not exceed trigger levels and at any of the monitoring sites listed in the Tables in Condition C – Water.</li> <li>Water quality monitoring is undertaken in accordance with the Receiving Environment Monitoring Program which must be developed in accordance with</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>Visual inspections of water management infrastructure show signs of failure.</li> </ul>	<ul style="list-style-type: none"> <li>Water quality monitoring will be undertaken in accordance with the REMP as required by Conditions C22 and C23 of the Project's EA.</li> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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</li> </ul>	<ul style="list-style-type: none"> <li>Water management is undertaken in accordance with the Water Management Plan and subsequent reviews. (Water Management Plan and Review 2019, Field).</li> <li>The machinery wash-bay is a closed system and does not discharge offsite. (Field (Washbay Inspection)).</li> <li>Spill response and clean-up procedures and equipment are in place at site. (Field).</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
	<p>Condition C22 of the Project EA.</p> <ul style="list-style-type: none"> <li>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.</li> </ul>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> </ul>			<p>authority as part of the Project's Annual Return.</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified will be implemented within 10 days of the trigger being detected.</li> </ul>	
<p>Minimise potential for mortality or injury to MNES from Project activities (e.g. habitat clearing, vehicle strikes etc.).</p>	<p>No mortality of, or injuries to, MNES as a result of Project activities (e.g. from clearing activities, vehicle strikes etc.).</p>	<ul style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>At least one qualified Fauna Spotter/Catcher will be present during clearing activities.</li> <li>A wildlife carer will be called to collect any injured fauna.</li> <li>Speed limits of 60 km/hour will be set and enforced on all internal roads including haul roads</li> <li>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.</li> <li>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.</li> <li>Where injured fauna is encountered, and it is unsafe to handle the animals, the following should be undertaken; <ul style="list-style-type: none"> <li>The location of the injured animal will be identified so it can be located again</li> <li>The species of animal will be identified if possible and its sex and approximate size determined</li> <li>The type of injury sustained will be identified if possible</li> <li>The EO shall immediately contact Queensland's Department of Environment and Science (DES) and report</li> </ul> </li> </ul>	<p>Injury or mortality to an MNES</p>	<ul style="list-style-type: none"> <li>All personnel will be required to report any interactions between vehicles and/or /machinery and MNES in the Project area.</li> <li>Visual observations during normal working hours.</li> <li>Incidental observations during habitat quality assessments.</li> </ul>	<ul style="list-style-type: none"> <li>Should an injury to, or mortality of, an MNES, an investigation will be undertaken to ascertain the cause of the injury or mortality.</li> <li>Should the injury or mortality be attributed to mining activities, a Contingency Plan will be developed by a suitably qualified ecologist within 20 business days and will include Corrective Actions and an implementation schedule for the Corrective Actions.</li> </ul> <p><b>Corrective Actions:</b></p> <ul style="list-style-type: none"> <li>Corrective actions identified in the contingency plan will be implemented within 30 days of the trigger being detected.</li> </ul>	<ul style="list-style-type: none"> <li>The site Induction Package addresses the MNES and fauna reporting requirements. (<i>HSEC Training Package</i>).</li> <li>The maximum site speed limit is 60 km\hr and signage is located throughout the site. (<i>Field</i>).</li> <li>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. (<i>EcoSM Spotter catcher letter report 8<sup>th</sup> of April 2020 addressing March / April 2020 clearing</i>).</li> <li>Injured fauna is directed to a carer in Moranbah and location found, species, and injury recorded. (<i>BP</i>).</li> </ul>

Habitat Management objectives	Performance criteria	Management and mitigation measures	Trigger for further action	Monitoring	Corrective actions	Audit Comments SLR February 2021 (Evidence)
		the animal and arrange for its capture and transportation to a wildlife carer or veterinarian.				

**Offset Management Plan - Table 21: Proposed monitoring schedule of offset area**

Habitat Quality surveys undertaken by suitably qualified ecologists						Audit Comments SLR July2019
Initial habitat quality assessment	Site condition, site context and species stocking rates.	Initial and baseline assessment was completed in May 2018	Visual inspections and detailed habitat quality assessment transects*	Assessment sites outlined in Section 7.3 (of OMP).	Completed as part of the OMP. (OMP).	
Site Condition	Recruitment of woody perennial species in the ecologically dominant layer (EDL)	2019 (following approval of this OMP), then annually for the first six (6) years, followed by every two (2) years until year 14, then in 2040.	As per the methods outlined in the Guide and in Section 4.1 (of OMP).	Assessment sites outlined in Section 7.3 (of OMP).	Due in October 2019.  The OMP relates to the Byrne Valley Station Offset area. The negotiation process for securing this offset was undertaken during the compliance reporting period and was ultimately unsuccessful (commercial and legal matters). Subsequently access to the property on which the proposed offset was to be located became unavailable and therefore the two-yearly Site Condition monitoring was not able to be achieved and would have provided no outcome gain were it to have been achievable.	
	Native plant species richness – trees		Visual observations and where relevant, methods outlined in the Guide to determining terrestrial habitat quality.			
	Native plant species richness – shrubs		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.			
	Native plant species richness – grasses					
	Native plant species richness – forbs					
	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 <sup>1</sup>	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	Presence/absence of MNES.				As above	

<sup>1</sup> Non-GIS attributes that can be measured in the field.

	MNES abundance and density (where relevant).				
<b>Visual inspection surveys undertaken by the landowner or authorised landowner representative and targeted weed and feral animal surveys undertaken by suitably qualified ecologists.</b>					
Photo points	General vegetation condition and vegetation cover.	2019 (following approval of this OMP), then annually for the first six (6) years, followed by every two (2) years until year 14, then in 2040.	Photographs of offset area to be taken from the same location and direction for each monitoring event.	Assessment sites outlined in Section 7.3 (of OMP)..	Due in October 2019. As above
Grazing	Stocking rates and ground cover.	Stocking rates will be routinely monitored until 2040. Biomass will be monitored annually in the early dry season.	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.	Assessment sites outlined in Section 7.0(of OMP).	
Fire	Presence of fire and extent of burning.	Following fire events.  Biomass will be monitored annually in the early dry season.	Detailed assessments as outlined in Section 7.0 (of OMP) will also be undertaken in conjunction with the habitat quality assessments		
Feral animals	Presence of pest animals, control measures undertaken and success of the control measures.	Visual inspections undertaken during routine land management.  2019 (following approval of this OMP), then annually for the first six (6) years, followed by every two (2) years until year 14, in 2040.			
Weeds/ pest plants	Presence of weeds, control measures undertaken and success of the control measures.	Visual inspections undertaken during routine land management.  2019 (following approval of this OMP), then annually for the first six (6) years, followed by every two (2) years until year 14, in 2040.			
Fencing and site access	Condition of fencing and access tracks.	Visual inspections undertaken during routine land management.			

# APPENDIX B

## Site Visit and Evidence Photos



Approved clearing limit markers (a)



Approved clearing limit marker (b)



Approved clearing limit marker ©



Fence Condition and lower strand clearance (a)



Fence Condition and lower strand clearance (b)



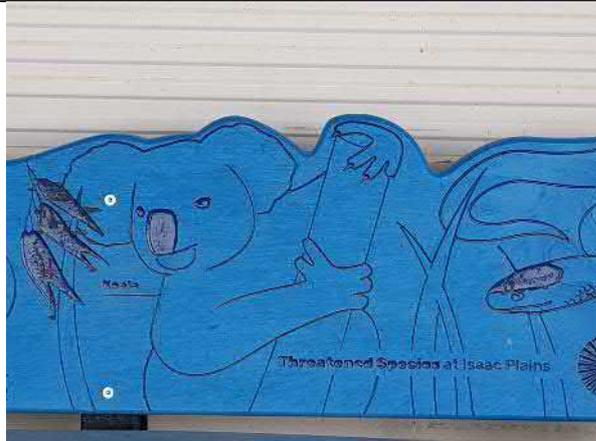
Free Dig Overburden Operations



MNES Species Bench Seats (a)



MNES Species Bench Seat (b)



MNES Species Bench Seat (c)



MNES Species Awareness Sign



Marked Habitat Tree for Salvage



Spill Kit



Spill Kit Contents



Spill Management Workshop



Nestbox (a)



Nestbox (b)



Dust Monitoring (a)



Dust Monitoring (b)



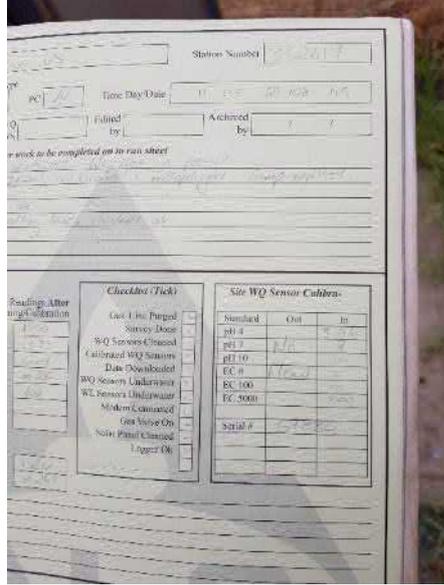
Water Monitoring Station Issac River (a)



Water Monitoring Station Issac River (b)



Water Monitoring Sensors Issac River (c)



Water Monitoring Station Issac River maintenance record



Washbay



2020 Rehabilitation



Retained Hollows for Fauna Relocation



New Disturbance Limit Markers



Squater Pigeon Nest Demarcation (a) – Stanmore Supplied



Squater Pigeon Nest Demarcation (b) – Stanmore Supplied



Squater Pigeon Nest Demarcation (c) – Stanmore Supplied



Squater Pigeon Nest Demarcation (d) – Stanmore Supplied



Squater Pigeon Nest Demarcation (e) – Stanmore  
Supplied

# APPENDIX C

## Isaac Plains Complex 2020 Annual Groundwater Review – May 2021



# C&R CONSULTING

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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  
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## 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".

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21/05/2021

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Date

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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	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	
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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 4<sup>th</sup> Dec 2020, which includes further land on leases ML700016, ML700017, ML700018 and ML700019. Operations commenced in these new areas in December 2020.

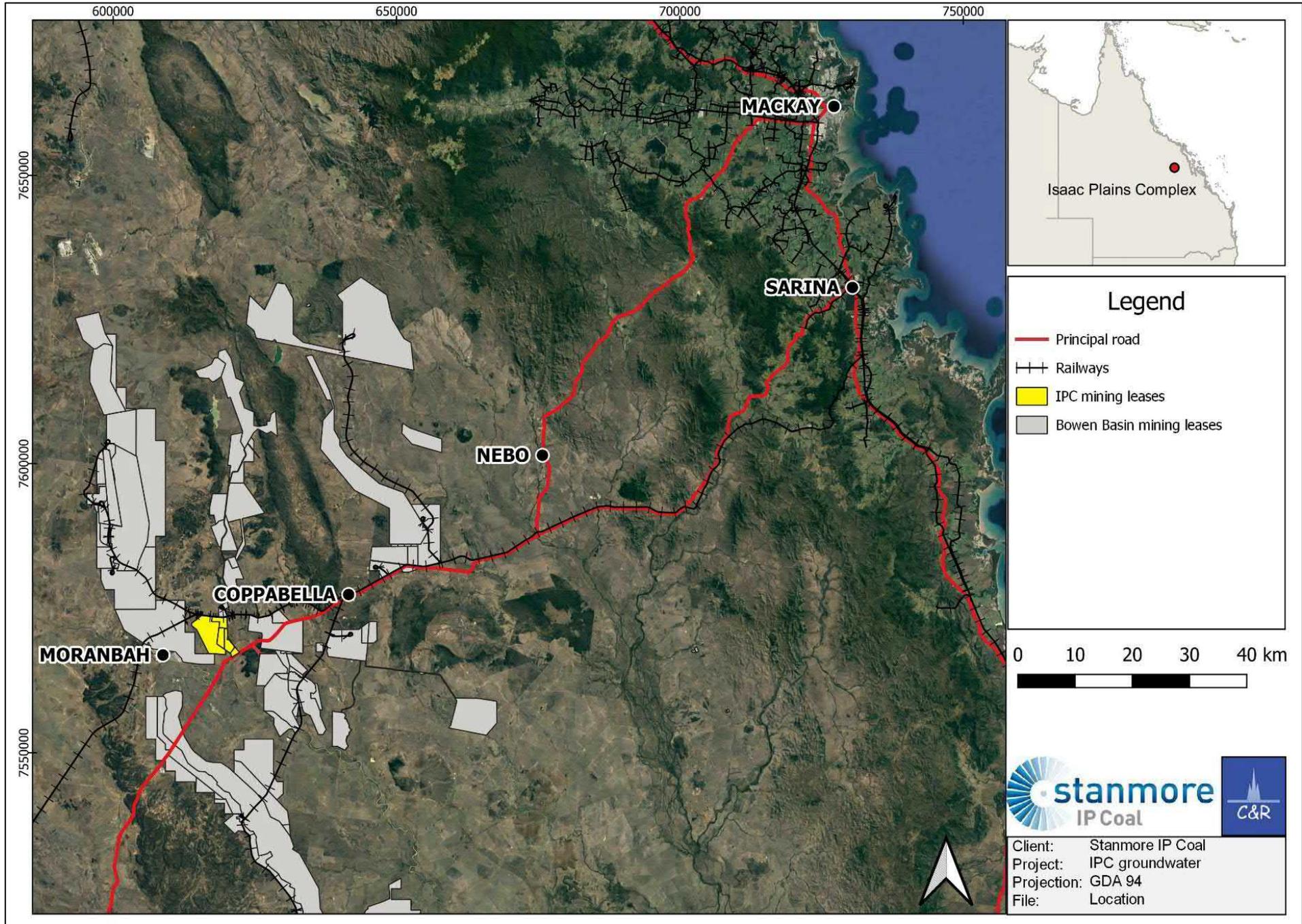


Figure 1: IPC location and mining leases.

## 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.

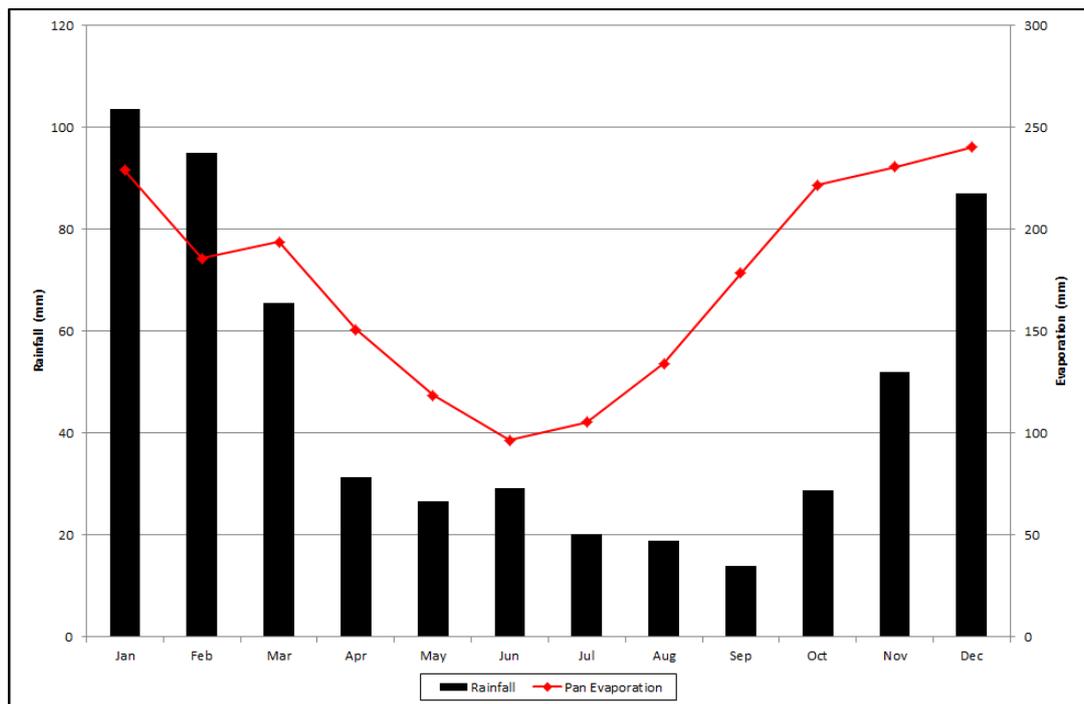


Figure 2: Average monthly rainfall and evaporation values for the region.

### 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 <sup>##</sup> .
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.

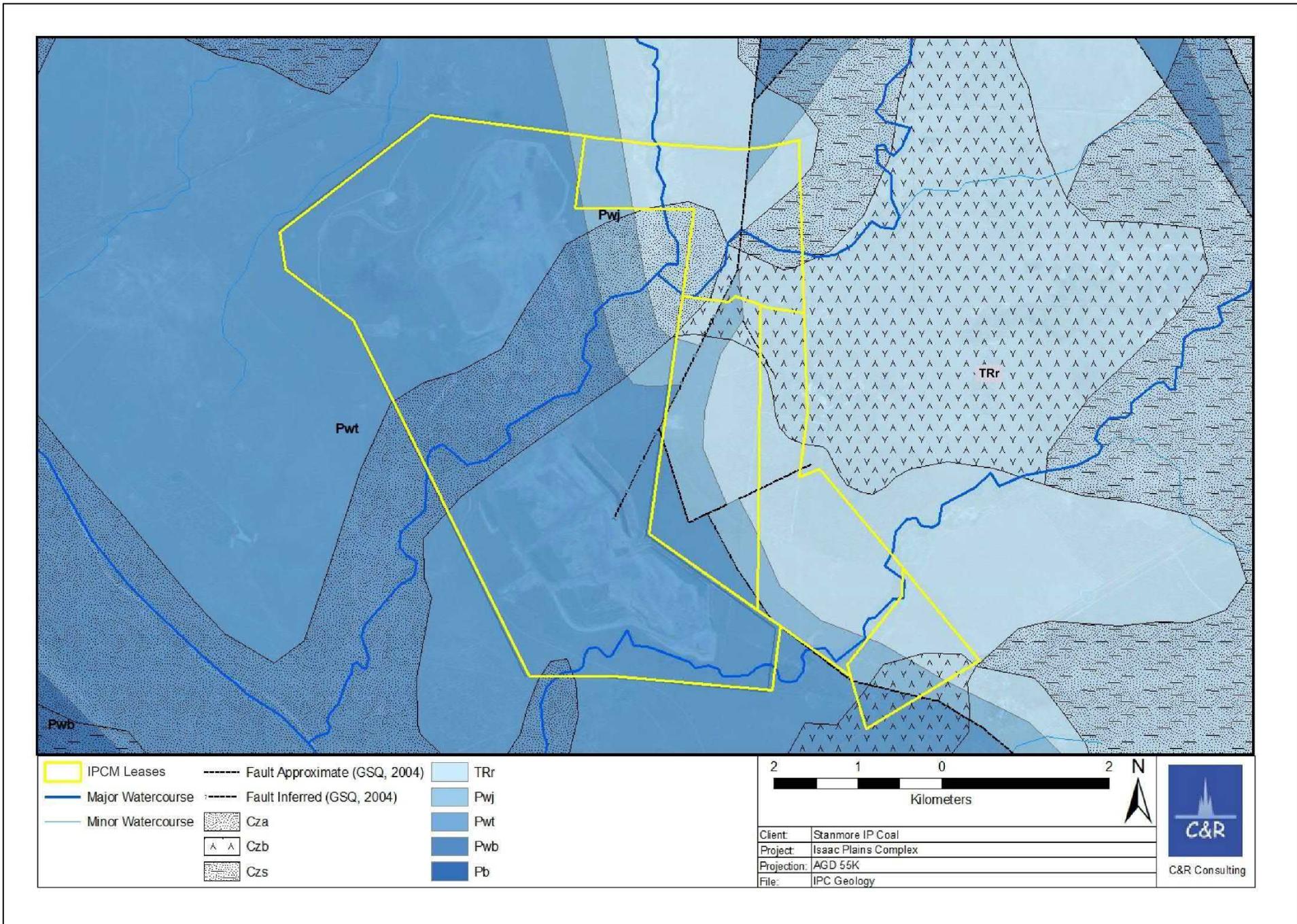


Figure 3: Major geological units for IPC.

## 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  $\mu\text{S}/\text{cm}$  to over 10,000  $\mu\text{S}/\text{cm}$  (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  $\mu\text{S}/\text{cm}$  and 5,300  $\mu\text{S}/\text{cm}$ . 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
<b>IPC Reference Bores (EA Table 11)</b>					
Burton Coal Bore 2	Rewan Group	620383	7573599	240.8	Monitoring groundwater trigger levels as per EA <b>C43</b> and EA <b>C44</b>
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 <b>C43</b> and EA <b>C44</b>
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 <sup>1</sup>	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>
<b>IPC To Be Commissioned Reference Bores (EA Table 11)</b>					
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>
<b>IPC Designated Observation Bores</b>					
MB7	Rangal Coal Measures	617537	7569064	237.4	Monitoring groundwater in advance of mine operations
GDEMB01	Quaternary Alluvium	621780	7569179	TBA <sup>2</sup>	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
<b>IPC Decommissioned Reference Bores (EA Table 11)</b>					
MB3	Rangal Coal Measures	619047	7568473	253.0	Monitoring groundwater in advance of mine operations
<b>IPC Decommissioned Observation Bores</b>					
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

<sup>1</sup> 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.

<sup>2</sup> TBA = To be advised, as the bore has yet to be surveyed.

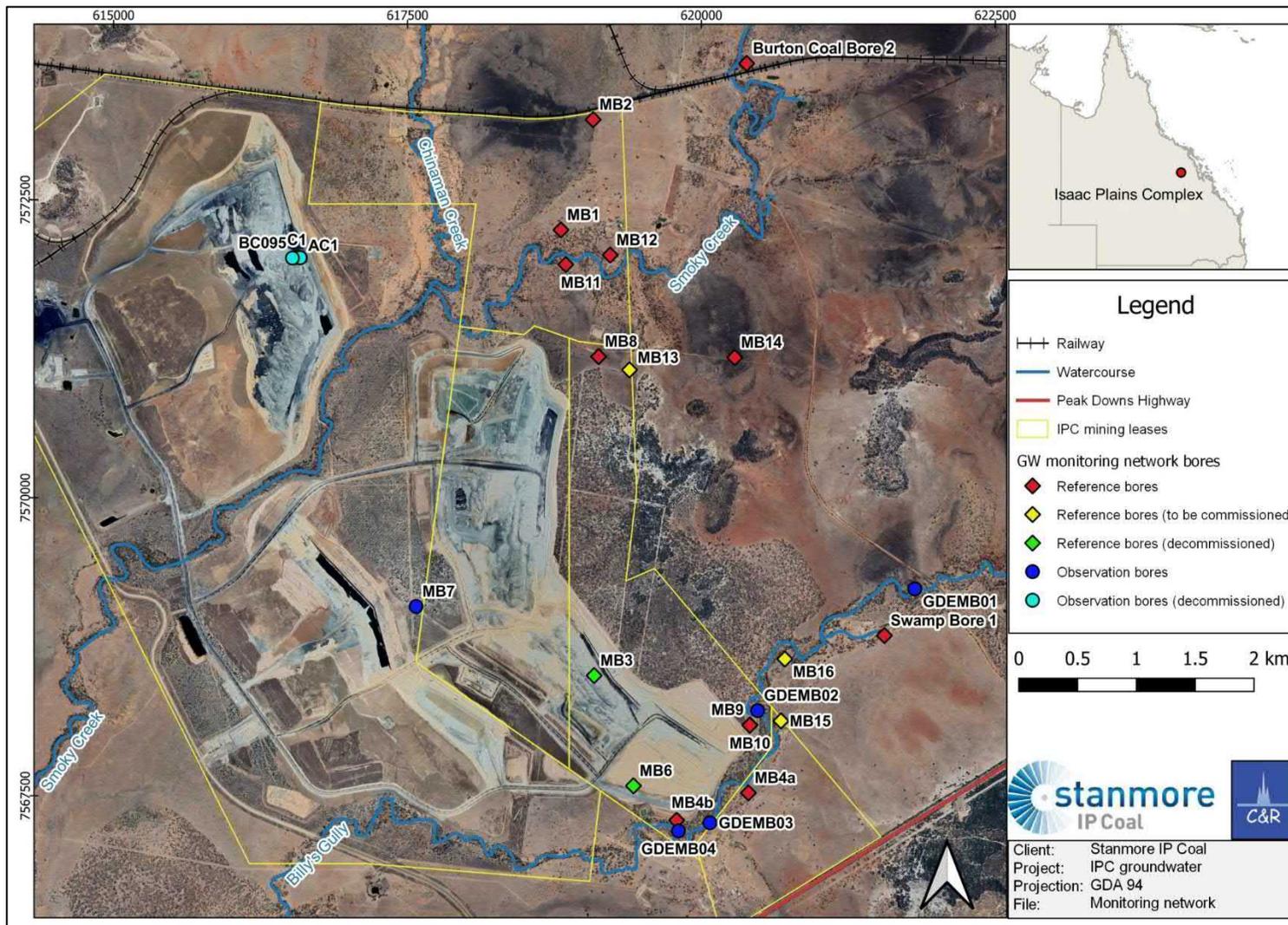


Figure 4: IPC groundwater monitoring network.

## 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.

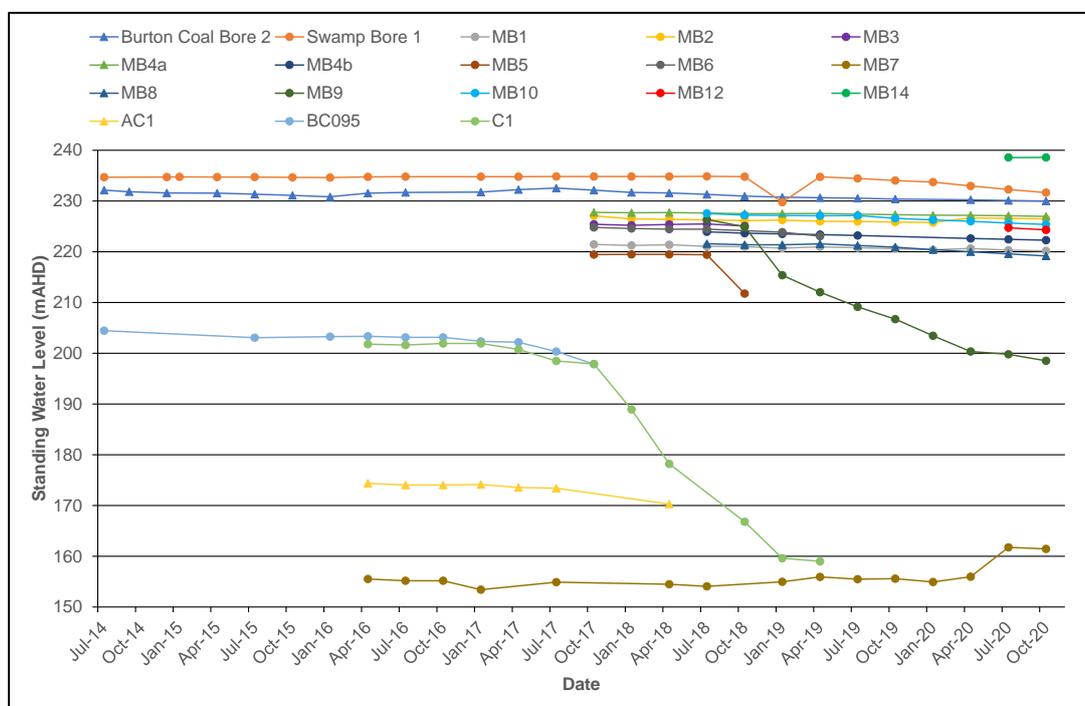


Figure 5: Standing water level variation across the groundwater monitoring network.

### 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.

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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
<b>EA Table 11 – Reference Bores</b>		
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
<b>IPC Designated Observation Bores</b>		
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%

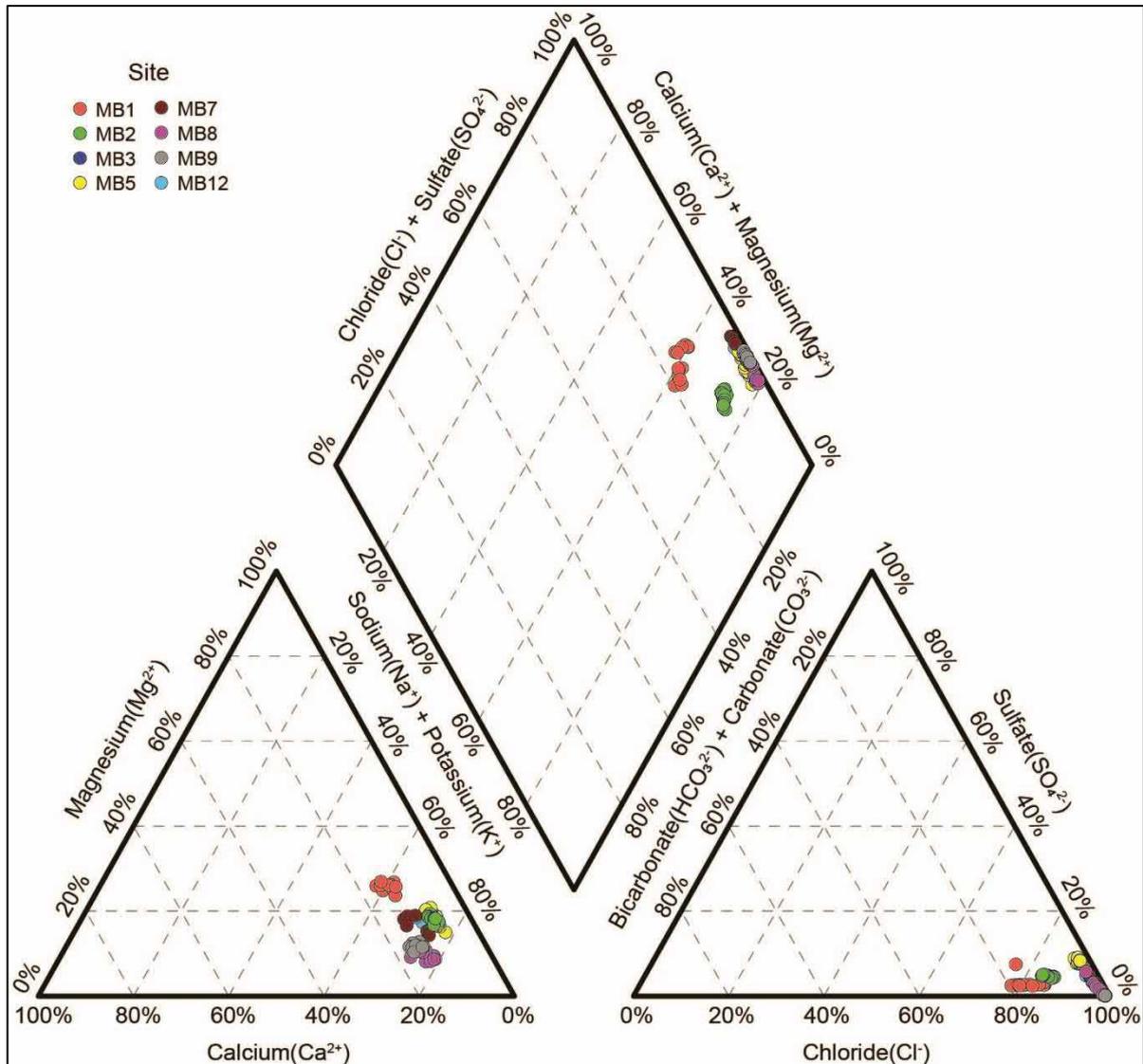


Figure 6: Difference in ionic composition of monitoring bores within the Rangal Coal Measures.

### 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 <sup>1</sup>	5	Rewan Group
MB14	1	Tertiary Basalt
MB16 <sup>2</sup>	5	Tertiary Sediments

<sup>1</sup> Swamp Bore 1 is referred to as Swamp Bore 2 in EA Table 13.

<sup>2</sup> 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).

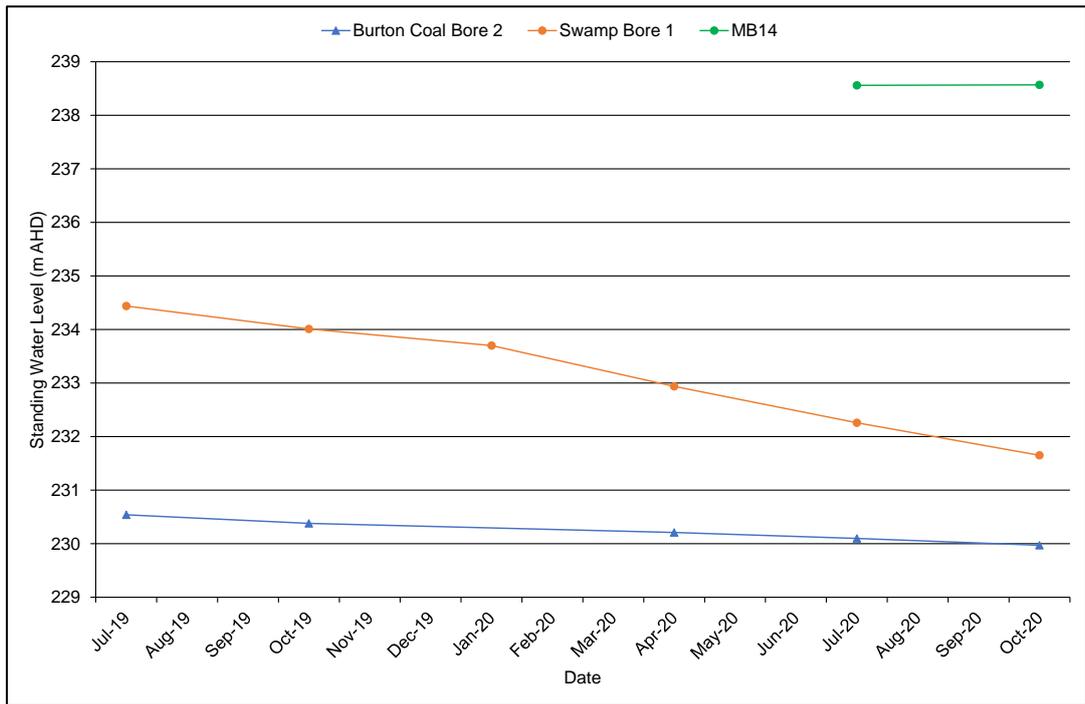


Figure 7: Groundwater level fluctuations for applicable monitoring bores.

## 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	<b>7.0 &lt; &gt; 8.3</b>	7.14	7.43	8.18	7.45	7.2
EC	µS/cm	1	<b>7320</b>	<b>7,320</b>	<b>7,430</b>	<b>7,520</b>	<b>7,660</b>	<b>7,620</b>
Chloride	mg/L	1	<b>2050</b>	<b>2,160</b>	<b>2,280</b>	<b>2,310</b>	<b>2,290</b>	<b>2,540</b>
Sulphate	mg/L	1	<b>130</b>	112	100	105	110	101
Calcium	mg/L	1	<b>195</b>	<b>213</b>	192	193	<b>245</b>	<b>233</b>
Magnesium	mg/L	1	<b>265</b>	<b>286</b>	<b>274</b>	<b>287</b>	<b>299</b>	<b>311</b>
Sodium	mg/L	1	<b>990</b>	955	877	932	<b>1010</b>	<b>990</b>
Potassium	mg/L	1	<b>8</b>	5	5	5	6	6
TDS @ 180°C	mg/L	10	<b>4500</b>	<b>4,940</b>	<b>4,790</b>	<b>4,770</b>	<b>4,750</b>	<b>5,020</b>
TSS	mg/L	5	<b>52</b>	BLOR	BLOR	BLOR	BLOR	12
Bicarbonate	mg/L	1	<b>820</b>	700	616	645	648	609
Carbonate	mg/L	1	<b>7</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Aluminum	mg/L	0.01	<b>0.01</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Antimony	mg/L	0.001	<b>0.001</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Arsenic	mg/L	0.001	<b>0.004</b>	BLOR	BLOR	0.002	BLOR	BLOR
Molybdenum	mg/L	0.001	<b>0.001</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Selenium	mg/L	0.01	<b>0.01</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Silver	mg/L	0.001	<b>0.001</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Iron	mg/L	0.05	<b>0.23</b>	BLOR	BLOR	BLOR	BLOR	BLOR
Mercury	mg/L	0.0001	<b>0.0001</b>	BLOR	BLOR	BLOR	BLOR	BLOR
C6 - C9 Fraction	µg/L	20	<b>20</b>	BLOR	BLOR	BLOR	BLOR	BLOR
C10 - C36 Fraction (sum)	µg/L	50	<b>50</b>	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	<b>7.1 &lt; &gt; 7.8</b>	7.39	7.46	7.44	7.70	7.50	7.30
EC	µS/cm	1	<b>9500</b>	9,010	8,780	8,860	9,150	9,010	8,850
Chloride	mg/L	1	<b>3500</b>	3,160	3,050	3,110	3,140	3,030	3,100
Sulphate	mg/L	1	<b>150</b>	130	113	128	121	130	119
Calcium	mg/L	1	<b>580</b>	556	520	520	515	<b>600</b>	536
Magnesium	mg/L	1	<b>165</b>	125	117	117	122	126	132
Sodium	mg/L	1	<b>1275</b>	1,100	1,050	1,060	1,070	1,170	1,110
Potassium	mg/L	1	<b>25</b>	22	21	21	21	23	22
TDS @ 180°C	mg/L	10	<b>7585</b>	6,800	6,380	6,430	6,460	5,890	5,610
TSS	mg/L	5	<b>37</b>	BLOR	BLOR	10	7	BLOR	BLOR
Bicarbonate	mg/L	1	<b>94</b>	56	49	57	67	52	49
Carbonate	mg/L	1	<b>1</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Aluminum	mg/L	0.01	<b>0.01</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Antimony	mg/L	0.001	<b>0.001</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Arsenic	mg/L	0.001	<b>0.002</b>	BLOR	BLOR	BLOR	BLOR	BLOR	<b>0.002</b>
Molybdenum	mg/L	0.001	<b>0.001</b>	BLOR	<b>0.001</b>	<b>0.002</b>	BLOR	<b>0.001</b>	<b>0.002</b>
Selenium	mg/L	0.01	<b>0.01</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Silver	mg/L	0.001	<b>0.001</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
Iron	mg/L	0.05	<b>1.00</b>	0.28	0.28	0.20	0.54	BLOR	BLOR
Mercury	mg/L	0.0001	<b>0.0001</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
C6 - C9 Fraction	µg/L	20	<b>20</b>	BLOR	BLOR	BLOR	BLOR	BLOR	BLOR
C10 - C36 Fraction (sum)	µg/L	50	<b>50</b>	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).



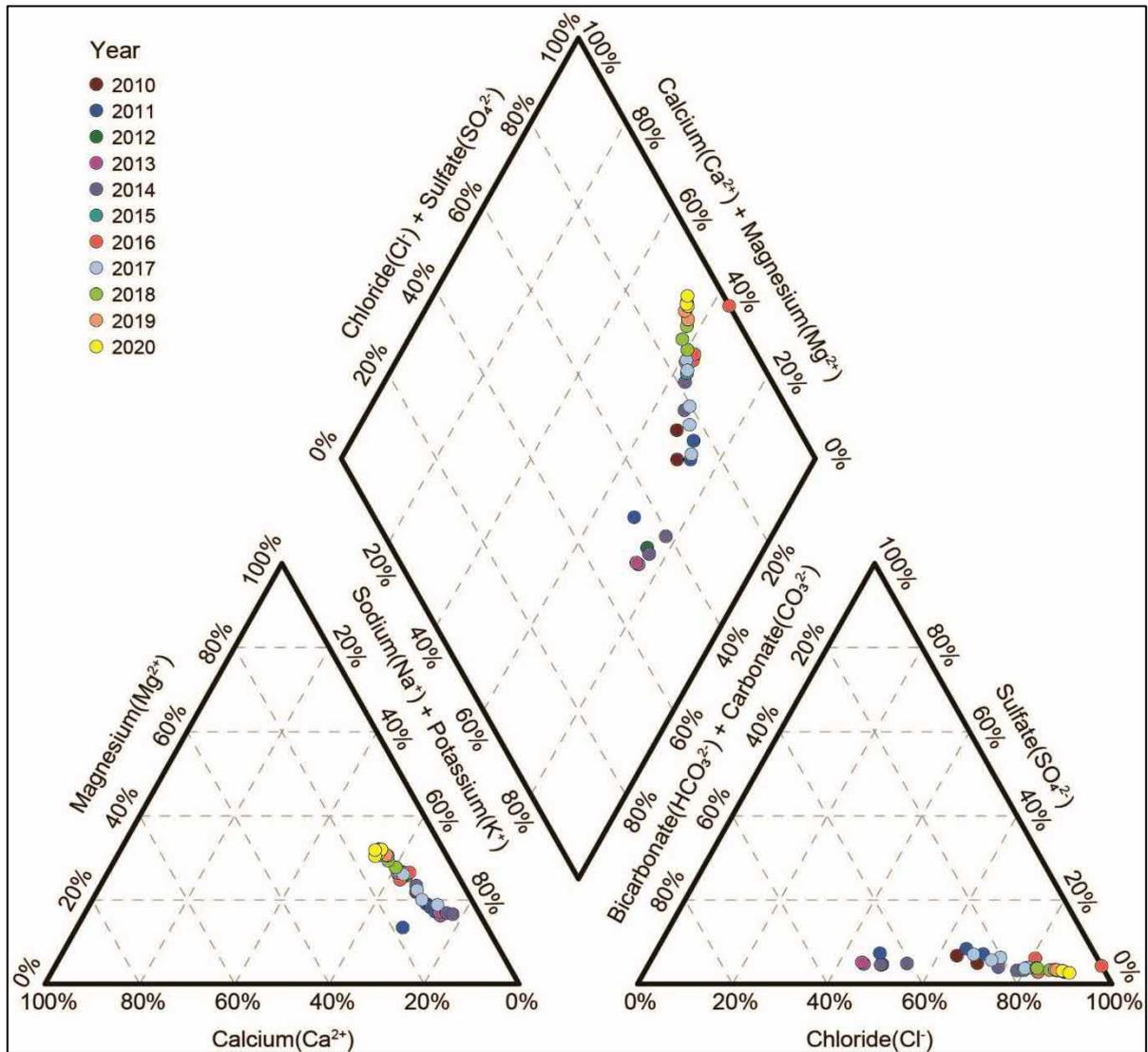


Figure 9: Ionic composition variation within Burton Coal Bore 2.

### 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).

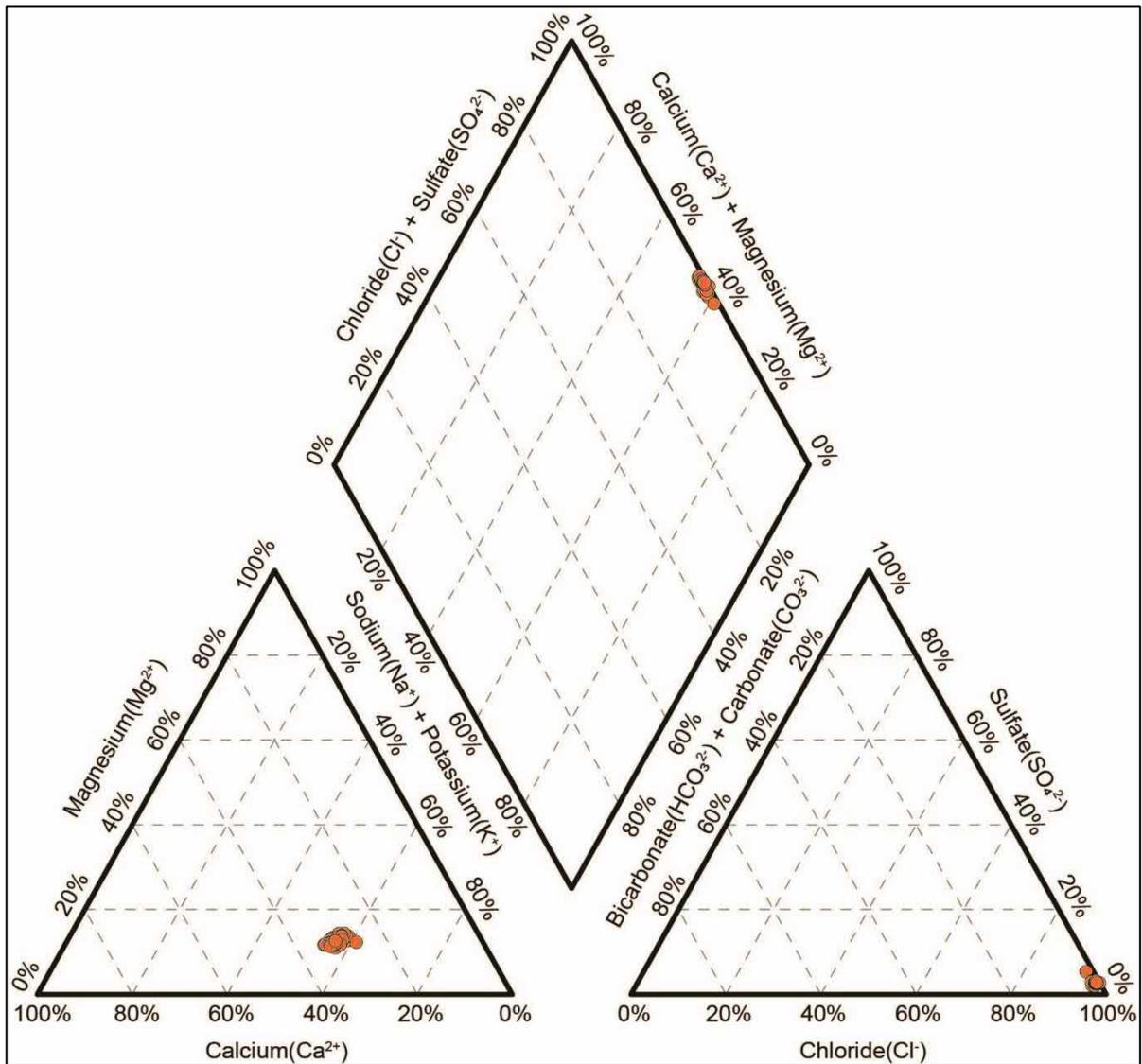


Figure 10: Ionic composition of Swamp Bore 1.



## 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 80<sup>th</sup> 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 80<sup>th</sup> 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	<b>9020</b>
Chloride	mg/L	1	2050	<b>2780</b>
Sulphate	mg/L	1	130	130
Calcium	mg/L	1	195	<b>260</b>
Magnesium	mg/L	1	265	<b>360</b>
Sodium	mg/L	1	990	<b>1110</b>
Potassium	mg/L	1	8	8
TDS @180°C	mg/L	10	4500	<b>5560</b>
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 (80<sup>th</sup> 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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- GSQ (2004). *Geological Survey of Queensland (GSQ) Geoscience Data 1:100,000 Sheet areas Harrybrandt (8554) and Grosvenor Downs (8553)*, compiled by Natural Resource Sciences – GSQ.
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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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.14	7.39	7.07	7.33	7.25	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	7320	9010	24100	3420	7870	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	4940	6800	17700	1890	4550	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	<5	19	<5	16	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	112	130	556	35	167	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	2160	3160	8440	827	2540	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	0.006	0.032	
Barium	7440-39-3	0.001	mg/L	0.102	0.204	3.45	0.124	0.136	
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.018	0.001	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	5.28	8.32	46.3	2.04	4.33	
Iron	7439-89-6	0.05	mg/L	0.20	0.47	1.40	0.16	1.85	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	0.2	<0.1	0.1	0.5	0.5	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.03	<0.05	<0.01	0.03	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	77.2	93.0	259	35.7	92.3	
∅ Total Cations	----	0.01	meq/L	75.8	86.4	253	34.0	78.0	
∅ Ionic Balance	----	0.01	%	0.92	3.64	1.27	2.34	8.38	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	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	EB1918178-007
				Result	Result	Result	Result	Result	Result
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
<b>EP080: BTEXN</b>									
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
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
<sup>^</sup> 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
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	110	121	113	119	108	108
Toluene-D8	2037-26-5	2	%	98.6	93.6	97.1	95.9	98.3	98.3
4-Bromofluorobenzene	460-00-4	2	%	94.9	96.8	97.0	99.9	96.2	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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	6.82	7.57	7.43	7.51	7.87	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	53100	31500	12300	11000	2820	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	41500	19900	8090	7600	1580	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	7530	7480	6	23	6	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	965	401	130	1	130	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	19500	10600	4270	3890	593	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	<b>0.031</b>	<b>0.018</b>	<b>0.004</b>	<b>0.003</b>	<b>0.002</b>	
Barium	7440-39-3	0.001	mg/L	<b>0.483</b>	<b>0.734</b>	<b>0.670</b>	<b>8.92</b>	<b>0.033</b>	
Molybdenum	7439-98-7	0.001	mg/L	<b>0.015</b>	<b>0.010</b>	<b>0.005</b>	<b>0.001</b>	<b>0.016</b>	
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	<b>22.9</b>	<b>7.35</b>	<b>19.8</b>	<b>12.6</b>	<b>0.843</b>	
Iron	7439-89-6	0.05	mg/L	<b>78.4</b>	<b>132</b>	<b>0.72</b>	<b>3.72</b>	<b>0.29</b>	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<b>0.0001</b>	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.3</b>	<b>0.6</b>	<b>0.2</b>	<b>0.2</b>	<b>0.2</b>	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>1.11</b>	<b>1.99</b>	<0.01	<b>0.10</b>	<b>0.10</b>	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>579</b>	<b>333</b>	<b>128</b>	<b>112</b>	<b>31.1</b>	
∅ Total Cations	----	0.01	meq/L	<b>640</b>	<b>357</b>	<b>115</b>	<b>99.8</b>	<b>27.3</b>	
∅ Ionic Balance	----	0.01	%	<b>5.00</b>	<b>3.58</b>	<b>4.98</b>	<b>5.69</b>	<b>6.48</b>	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	<b>80</b>	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<b>80</b>	<50	<50	<50	<50	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	<b>150</b>	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<b>150</b>	<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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
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	
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	----	----	----	----
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.45	----	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	12300	----	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	8000	----	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	11	----	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>								
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	----	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	128	----	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	4250	----	----	----	----
<b>ED093F: Dissolved Major Cations</b>								
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	----	----	----	----
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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	----	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>								
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	----	----	----	----	----
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<b>0.004</b>	----	----	----	----	----
Barium	7440-39-3	0.001	mg/L	<b>0.681</b>	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<b>0.005</b>	----	----	----	----	----
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	<b>19.5</b>	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<b>0.68</b>	----	----	----	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.2</b>	----	----	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.02</b>	----	----	----	----	----
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>127</b>	----	----	----	----	----
∅ Total Cations	----	0.01	meq/L	<b>114</b>	----	----	----	----	----
∅ Ionic Balance	----	0.01	%	<b>5.48</b>	----	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
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	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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



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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.46	7.43	7.38	7.59	7.57	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	8780	7430	23500	4040	7580	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	6380	4790	16600	2350	4500	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	<5	14	<5	<5	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	113	100	559	46	154	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	3050	2280	8650	1080	2150	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	0.1	0.4	0.5
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		0.02	0.01	<0.05	0.02	0.04
<b>EN055: Ionic Balance</b>									
∅ 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
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
<b>EP080: BTEXN</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.16	7.66	8.04	7.69	7.40	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	49300	10700	3780	11800	23600	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	39100	7160	2200	7890	16600	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	830	<5	45	9	10	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	842	2	111	87	561	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	19900	3840	1010	4180	8610	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.2	0.2	0.2	0.1	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	90.7	0.01	0.19	<0.05	<0.05	
<b>EN055: Ionic Balance</b>									
∅ 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	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
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	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	----	----	----	----
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	5.98	----	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	----	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	<10	----	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>								
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	----	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
<b>ED093F: Dissolved Major Cations</b>								
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	----	----	----	----
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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	----	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>								
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	----	----	----	----	----
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	----	----	----	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----	----
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	0.04	----	----	----	----	----
∅ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
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	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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

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



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
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.44	7.45	7.26	6.74	7.49
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	8860	3210	7400	52600	10600
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	6430	1890	4590	39300	7270
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	10	<5	<5	1210	5
<b>ED037P: Alkalinity by PC Titrator</b>								
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
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	128	35	162	983	4
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	3110	817	1960	19700	3830
<b>ED093F: Dissolved Major Cations</b>								
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
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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
<b>EG020T: Total Metals by ICP-MS</b>								
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.5	0.5	0.3	0.2	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.10	0.02	0.03	0.24	<0.05	
<b>EN055: Ionic Balance</b>									
∅ 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	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
<b>EP080: BTEXN</b>									
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
<sup>^</sup> Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
<sup>^</sup> Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	8.15	6.72	----	7.47	7.23	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	3550	<1	----	11500	20500	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	2120	<10	----	8200	12200	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	10	<5	----	20	<5	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	115	<1	----	12	323	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	923	<1	----	4150	7230	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Arsenic	7440-38-2	0.001	mg/L	<b>0.002</b>	<0.001	----	<b>0.004</b>	<0.001	
Barium	7440-39-3	0.001	mg/L	<b>0.041</b>	<0.001	----	<b>2.36</b>	<b>1.50</b>	
Molybdenum	7439-98-7	0.001	mg/L	<b>0.016</b>	<0.001	----	<b>0.006</b>	<b>0.001</b>	
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	<b>1.19</b>	<0.001	----	<b>11.8</b>	<b>35.6</b>	
Iron	7439-89-6	0.05	mg/L	<b>0.52</b>	<0.05	----	<b>0.35</b>	<b>0.59</b>	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.2</b>	<0.1	----	<b>0.3</b>	<b>0.1</b>	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.11</b>	<0.01	----	<0.05	<0.05	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>36.6</b>	<b>0.10</b>	----	<b>119</b>	<b>217</b>	
∅ Total Cations	----	0.01	meq/L	<b>33.4</b>	<0.01	----	<b>106</b>	<b>202</b>	
∅ Ionic Balance	----	0.01	%	<b>4.58</b>	----	----	<b>5.99</b>	<b>3.49</b>	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	<100	<100	
<b>EP080: BTEXN</b>									
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	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	----	----	----	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.21	----	----	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	20500	----	----	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	15000	----	----	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>									
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	----	----	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	317	----	----	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	7310	----	----	----	----	----
<b>ED093F: Dissolved Major Cations</b>									
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	----	----	----	----	----
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	----	----	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>									
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	----	----	----	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.001	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<b>0.001</b>	----	----	----	----	
Barium	7440-39-3	0.001	mg/L	<b>1.26</b>	----	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<b>0.002</b>	----	----	----	----	
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	<b>36.8</b>	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<b>0.56</b>	----	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.1</b>	----	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<0.05	----	----	----	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>219</b>	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	<b>193</b>	----	----	----	----	
∅ Ionic Balance	----	0.01	%	<b>6.18</b>	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
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	----	----	----	
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	----	----	----	
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.70	8.18	8.30	8.30	7.85
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	9150	7520	3760	7370	49700
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	6460	4770	2080	4330	41000
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	7	<5	30	6	1690
<b>ED037P: Alkalinity by PC Titrator</b>								
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
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	121	105	37	148	926
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	3140	2310	965	1930	19800
<b>ED093F: Dissolved Major Cations</b>								
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
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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
<b>EG020T: Total Metals by ICP-MS</b>								
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
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	0.0002
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.2	0.5	0.6	0.3
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		0.03	<0.01	0.06	0.02	0.86
<b>EN055: Ionic Balance</b>									
∅ 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
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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		
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
<b>EP080: BTEXN</b>										
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		
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
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
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	8.31	7.93	7.96	7.99	8.53
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	31000	20100	11500	10900	3480
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	20500	15200	7960	7740	1950
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	10500	13	72	76	<5
<b>ED037P: Alkalinity by PC Titrator</b>								
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
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	378	233	3	2	106
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	10800	7150	4170	3880	862
<b>ED093F: Dissolved Major Cations</b>								
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
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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
<b>EG020T: Total Metals by ICP-MS</b>								
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	<b>0.017</b>	<b>0.001</b>	<b>0.004</b>	<b>0.002</b>	<b>0.001</b>	
Barium	7440-39-3	0.001	mg/L	<b>0.409</b>	<b>1.45</b>	<b>4.12</b>	<b>7.75</b>	<b>0.094</b>	
Molybdenum	7439-98-7	0.001	mg/L	<b>0.011</b>	<b>0.006</b>	<b>0.002</b>	<b>0.003</b>	<b>0.020</b>	
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	<b>8.19</b>	<b>40.8</b>	<b>14.2</b>	<b>12.3</b>	<b>1.12</b>	
Iron	7439-89-6	0.05	mg/L	<b>63.6</b>	<b>0.91</b>	<b>1.37</b>	<b>2.63</b>	<b>0.29</b>	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.8</b>	<0.1	<b>0.2</b>	<b>0.2</b>	<b>0.3</b>	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.94</b>	<0.05	<0.05	<b>0.12</b>	<b>0.12</b>	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>335</b>	<b>212</b>	<b>120</b>	<b>111</b>	<b>35.0</b>	
∅ Total Cations	----	0.01	meq/L	<b>340</b>	<b>192</b>	<b>107</b>	<b>99.7</b>	<b>34.5</b>	
∅ Ionic Balance	----	0.01	%	<b>0.79</b>	<b>4.87</b>	<b>5.36</b>	<b>5.56</b>	<b>0.84</b>	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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		
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
<b>EP080: BTEXN</b>										
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		
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
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	----	----	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.97	6.38	----	----	----	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	19900	1	----	----	----	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	14300	<10	----	----	----	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	<5	----	----	----	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	----	----	----	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	231	<1	----	----	----	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	7100	<1	----	----	----	
<b>ED093F: Dissolved Major Cations</b>									
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	----	----	----	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	----	----	----	
<b>EG020T: Total Metals by ICP-MS</b>									
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	----	----	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	<b>1.31</b>	<0.001	----	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<b>0.005</b>	<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	<b>43.5</b>	<0.001	----	----	----	
Iron	7439-89-6	0.05	mg/L	<b>1.01</b>	<0.05	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<0.05	<0.01	----	----	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>210</b>	<b>0.10</b>	----	----	----	
∅ Total Cations	----	0.01	meq/L	<b>194</b>	<0.01	----	----	----	
∅ Ionic Balance	----	0.01	%	<b>4.10</b>	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----		
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	----	----
<b>EP080: BTEXN</b>										
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	----	----		
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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



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>
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.50	7.45	7.58	7.50	7.15	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	9010	7660	3380	7320	52700	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	5890	4750	1860	4100	39200	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	<5	<5	16	793	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	130	110	36	146	960	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	3030	2290	817	1910	19900	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	0.2	0.5	0.5	0.3	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.02	0.04	0.04	0.13	
<b>EN055: Ionic Balance</b>									
∅ 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	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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		
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
<b>EP080: BTEXN</b>										
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		
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.39	7.50	7.70	8.12	7.43	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	24000	11500	10900	4300	23900	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	16100	7160	6820	2520	16000	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	28	63	<5	<5	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	547	2	3	124	547	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	8260	4010	3760	1140	8230	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L		0.1	0.2	0.2	0.2	0.1
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		<0.05	<0.05	0.04	0.07	<0.05
<b>EN055: Ionic Balance</b>									
∅ 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
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>										
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
<b>EP080: BTEXN</b>										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<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	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
<b>EP080S: TPH(V)/BTEX Surrogates</b>										
1,2-Dichloroethane-D4				17060-07-0	2	%	97.8	98.4	97.6	97.1
Toluene-D8				2037-26-5	2	%	97.0	99.7	98.4	98.5
4-Bromofluorobenzene				460-00-4	2	%	100	102	101	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	----	----	----	----	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	5.72	----	----	----	----	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	<1	----	----	----	----	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	<10	----	----	----	----	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	----	----	----	----	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	----	----	----	----	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----	
<b>ED093F: Dissolved Major Cations</b>									
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	----	----	----	----	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	----	----	----	----	
<b>EG020T: Total Metals by ICP-MS</b>									
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	----	----	----	----	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	----	----	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>0.08</b>	----	----	----	----	
∅ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
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	----	----	----	----	----
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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

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



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>
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	----	----		
<b>EA005P: pH by PC Titrator</b>										
pH Value	----	0.01	pH Unit	7.70	7.43	7.81	----	----		
<b>EA010P: Conductivity by PC Titrator</b>										
Electrical Conductivity @ 25°C	----	1	µS/cm	30700	12300	2980	----	----		
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>										
Total Dissolved Solids @180°C	----	10	mg/L	19700	7900	1740	----	----		
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>										
Suspended Solids (SS)	----	5	mg/L	35400	20	64	----	----		
<b>ED037P: Alkalinity by PC Titrator</b>										
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	----	----		
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>										
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	406	205	119	----	----		
<b>ED045G: Chloride by Discrete Analyser</b>										
Chloride	16887-00-6	1	mg/L	10800	4360	731	----	----		
<b>ED093F: Dissolved Major Cations</b>										
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	----	----		
<b>EG020F: Dissolved Metals by ICP-MS</b>										
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	----	----		
<b>EG020T: Total Metals by ICP-MS</b>										
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	----	----	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.005	<0.001	<0.001	----	----	
Arsenic	7440-38-2	0.001	mg/L	<b>0.047</b>	<b>0.003</b>	<b>0.003</b>	----	----	
Barium	7440-39-3	0.001	mg/L	<b>2.55</b>	<b>1.32</b>	<b>0.062</b>	----	----	
Molybdenum	7439-98-7	0.001	mg/L	<0.005	<b>0.014</b>	<b>0.002</b>	----	----	
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	<b>12.4</b>	<b>16.4</b>	<b>1.30</b>	----	----	
Iron	7439-89-6	0.05	mg/L	<b>270</b>	<b>0.77</b>	<b>4.45</b>	----	----	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<b>0.0004</b>	<0.0001	<0.0001	----	----	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<b>0.6</b>	<b>0.2</b>	<0.1	----	----	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>11.0</b>	<0.05	<b>0.16</b>	----	----	
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>336</b>	<b>132</b>	<b>32.1</b>	----	----	
∅ Total Cations	----	0.01	meq/L	<b>357</b>	<b>132</b>	<b>32.5</b>	----	----	
∅ Ionic Balance	----	0.01	%	<b>3.04</b>	<b>0.27</b>	<b>0.60</b>	----	----	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	<b>100</b>	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<b>100</b>	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	<b>170</b>	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<b>170</b>	----	----	



## 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	----	----	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
<b>EP080: BTEXN</b>									
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	----	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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

<b>Work Order</b> : <b>EB2023609</b> <b>Client</b> : <b>STANMORE IP COAL PTY LTD</b> <b>Contact</b> : BELINDA PARFITT <b>Address</b> : GPO BOX 2602 BRISBANE QLD 4001 <b>Telephone</b> : 07 4816 7444 <b>Project</b> : IPCM <b>Order number</b> : P1002091 <b>C-O-C number</b> : ---- <b>Sampler</b> : LIAM HAMERSVELD <b>Site</b> : ---- <b>Quote number</b> : TV/005/19 v4 <b>No. of samples received</b> : 16 <b>No. of samples analysed</b> : 14	<b>Page</b> : 1 of 12 <b>Laboratory</b> : Environmental Division Brisbane <b>Contact</b> : Anna Riddell <b>Address</b> : 2 Byth Street Stafford QLD Australia 4053  <b>Telephone</b> : +61 7 4952 5795 <b>Date Samples Received</b> : 29-Oct-2020 12:00 <b>Date Analysis Commenced</b> : 30-Oct-2020 <b>Issue Date</b> : 09-Nov-2020 09:13
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Accreditation No. 825  
Accredited for compliance with  
ISO/IEC 17025 - Testing

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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

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.

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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.

- 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
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.30	7.20	7.38	7.39	6.85
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	8850	7620	3350	7250	52800
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	5610	5020	1970	4350	47900
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	<5	12	11	15	3800
<b>ED037P: Alkalinity by PC Titrator</b>								
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
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	119	101	35	153	969
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	3100	2540	836	1900	19200
<b>ED093F: Dissolved Major Cations</b>								
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
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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
<b>EG020T: Total Metals by ICP-MS</b>								
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	EB2023609-005
				Result	Result	Result	Result	Result	Result
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005
Arsenic	7440-38-2	0.001	mg/L	<b>0.002</b>	<0.001	<b>0.007</b>	<b>0.031</b>	<b>0.009</b>	<b>0.009</b>
Barium	7440-39-3	0.001	mg/L	<b>0.206</b>	<b>0.157</b>	<b>0.217</b>	<b>0.162</b>	<b>0.274</b>	<b>0.274</b>
Molybdenum	7439-98-7	0.001	mg/L	<b>0.001</b>	<0.001	<0.001	<b>0.002</b>	<0.005	<0.005
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.05	<0.05
Silver	7440-22-4	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.005	<0.005
Strontium	7440-24-6	0.001	mg/L	<b>8.59</b>	<b>6.14</b>	<b>2.04</b>	<b>3.70</b>	<b>24.7</b>	<b>24.7</b>
Iron	7439-89-6	0.05	mg/L	<b>0.11</b>	<b>0.08</b>	<b>0.11</b>	<b>0.49</b>	<b>14.6</b>	<b>14.6</b>
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<b>0.2</b>	<b>0.5</b>	<b>0.5</b>	<b>0.3</b>	<b>0.3</b>
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.07</b>	<b>0.02</b>	<0.01	<b>0.02</b>	<b>0.14</b>	<b>0.14</b>
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>90.9</b>	<b>85.9</b>	<b>34.8</b>	<b>71.7</b>	<b>569</b>	<b>569</b>
∅ Total Cations	----	0.01	meq/L	<b>86.4</b>	<b>80.4</b>	<b>33.9</b>	<b>74.6</b>	<b>677</b>	<b>677</b>
∅ Ionic Balance	----	0.01	%	<b>2.51</b>	<b>3.30</b>	<b>1.19</b>	<b>1.98</b>	<b>8.65</b>	<b>8.65</b>
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<b>380</b>	<b>380</b>
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<b>380</b>	<b>380</b>
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<b>310</b>	<b>310</b>
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<b>310</b>	<b>310</b>



## 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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	310
<b>EP080: BTEXN</b>									
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
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
<sup>^</sup> 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
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.22	7.45	7.43	7.96	7.20	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	24500	11000	10700	3460	13300	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	18300	8290	8120	2030	10100	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	34	214	12	16	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	605	6	3	113	321	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	8630	3910	3830	891	4580	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L		0.1	0.2	0.2	0.3	0.1
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		<0.05	0.02	0.14	0.05	<0.05
<b>EN055: Ionic Balance</b>									
∅ 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
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
<b>EP080: BTEXN</b>									
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	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	----	----
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.81	7.28	6.87	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	3060	24500	<1	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	1860	18600	<10	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	5	<5	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>									
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	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	114	608	<1	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	744	8630	<1	----	----	----
<b>ED093F: Dissolved Major Cations</b>									
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	----	----	----
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>									
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	----	----
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
Antimony	7440-36-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<b>0.002</b>	<b>0.003</b>	<0.001	----	----	----
Barium	7440-39-3	0.001	mg/L	<b>0.069</b>	<b>0.620</b>	<0.001	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<0.001	<b>0.003</b>	<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	<b>1.10</b>	<b>49.0</b>	<0.001	----	----	----
Iron	7439-89-6	0.05	mg/L	<b>0.07</b>	<b>1.08</b>	<0.05	----	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	----
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	<0.1	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.05</b>	<0.05	<b>0.01</b>	----	----	----
<b>EN055: Ionic Balance</b>									
∅ Total Anions	----	0.01	meq/L	<b>32.5</b>	<b>266</b>	<b>0.06</b>	----	----	----
∅ Total Cations	----	0.01	meq/L	<b>32.9</b>	<b>276</b>	<0.01	----	----	----
∅ Ionic Balance	----	0.01	%	<b>0.65</b>	<b>1.88</b>	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	-----	-----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	-----	-----
<b>EP080: BTEXN</b>									
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	-----	-----
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	<2	<2	-----	-----
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	<1	4	<1	-----	-----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	-----	-----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
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

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*

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## 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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Dr Chris Cuff  
Director

5/8/2020

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Date

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Dr Cecily Rasmussen  
Director

5/8/2020

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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.
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## 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
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## DOCUMENT CONTROL

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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.

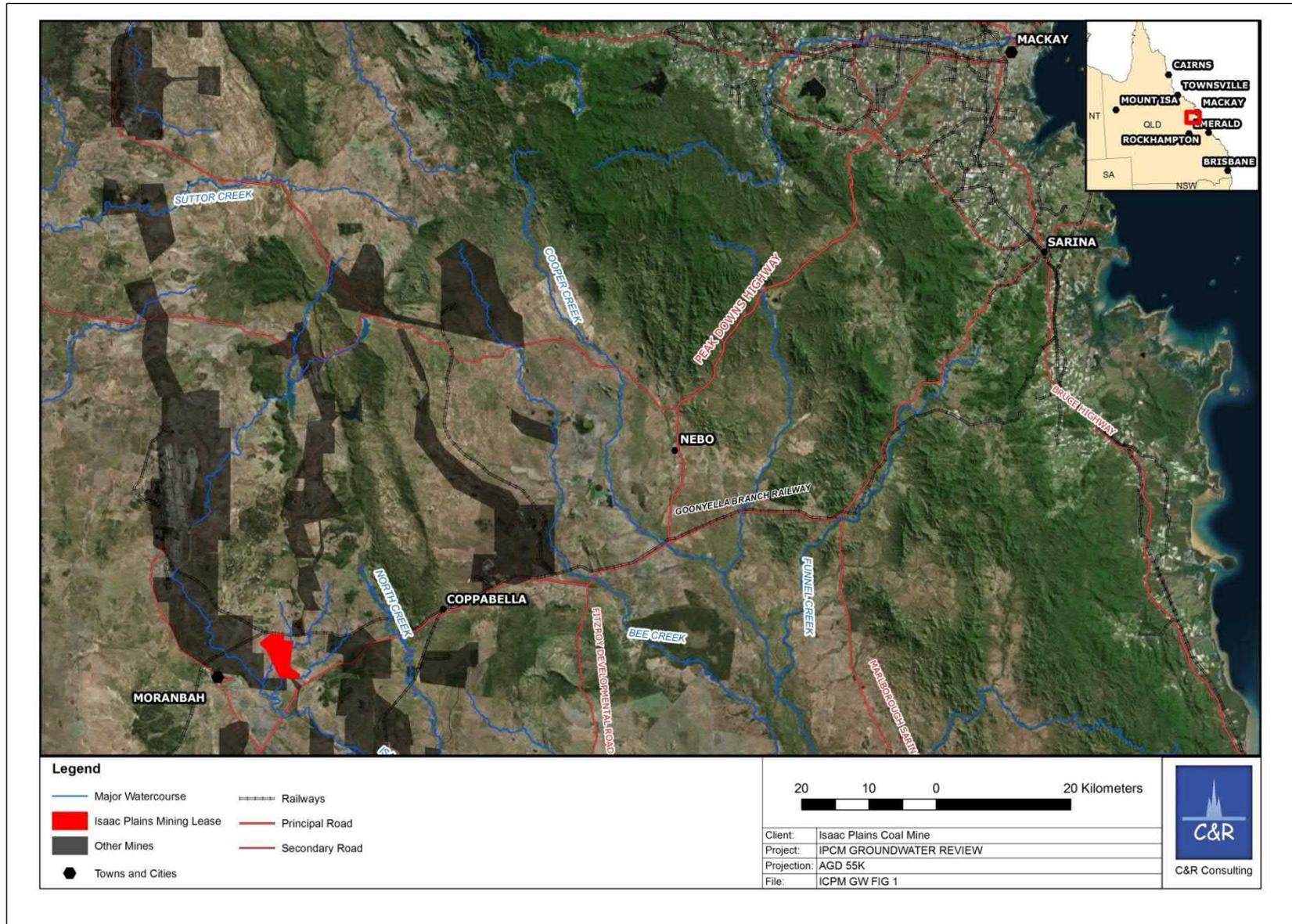


Figure 1: IPC location within Central Queensland.

## 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.

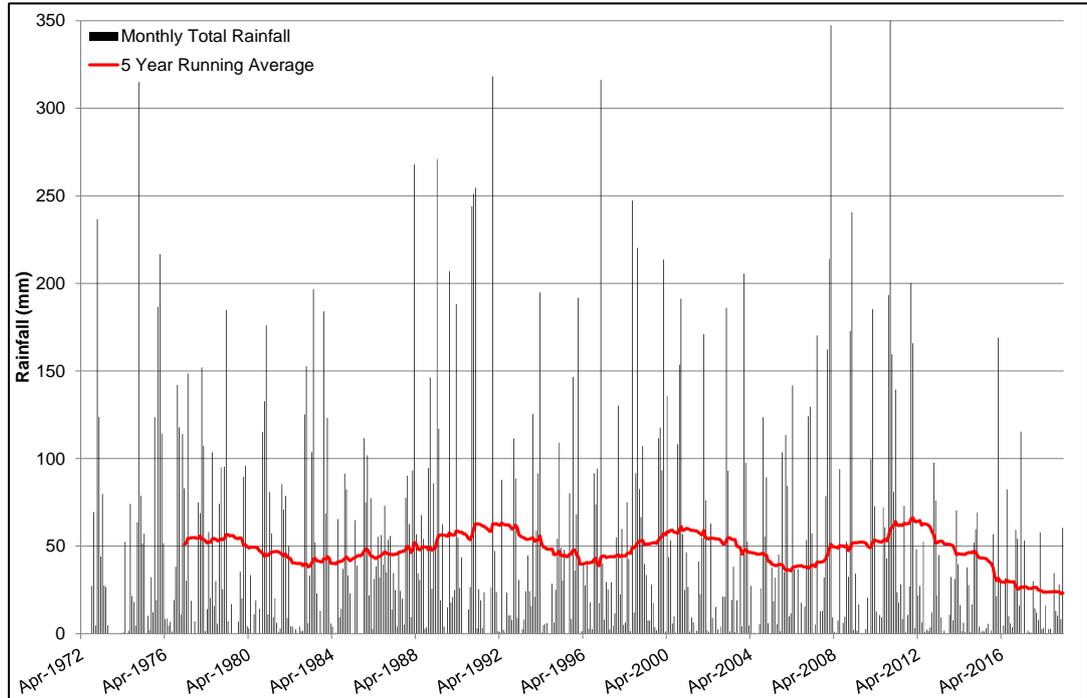


Figure 2: Monthly rainfall totals and 5-year running average.



## 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 <sup>#</sup>	Age	Group	Name/Formation	Short Description
Cza	Quaternary		Alluvium	Alluvium: mud, sand, minor gravel Colluvium and residual soil: mud, sand, gravel <sup>##</sup>
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	

<sup>#</sup>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.

<sup>##</sup>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) <sup>1</sup>	Northing (GDA 94) <sup>1</sup>	Surface RL <sup>2</sup> (mAHD) <sup>1</sup>
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.

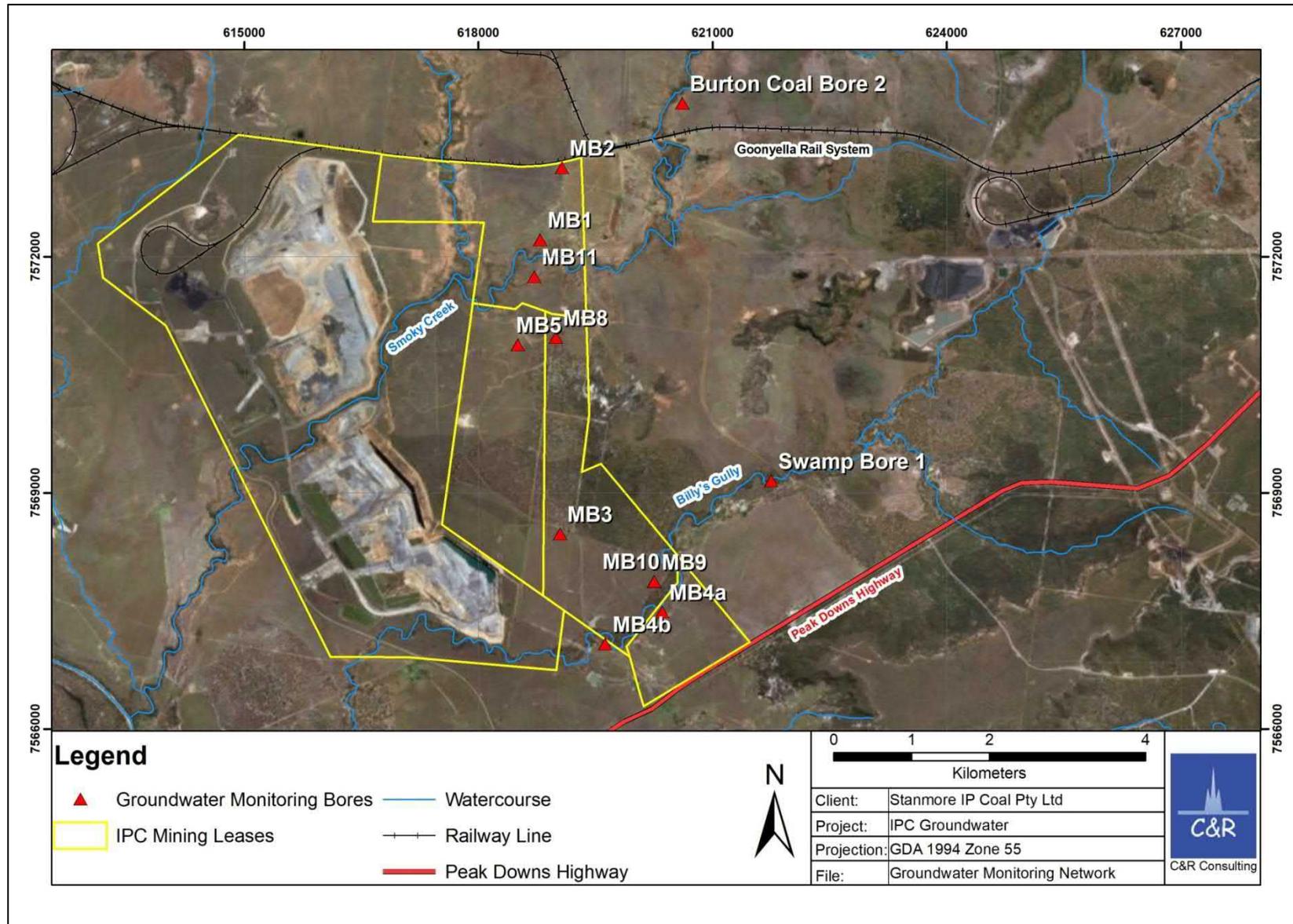


Figure 3: Groundwater monitoring network at IPC.



## 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.**

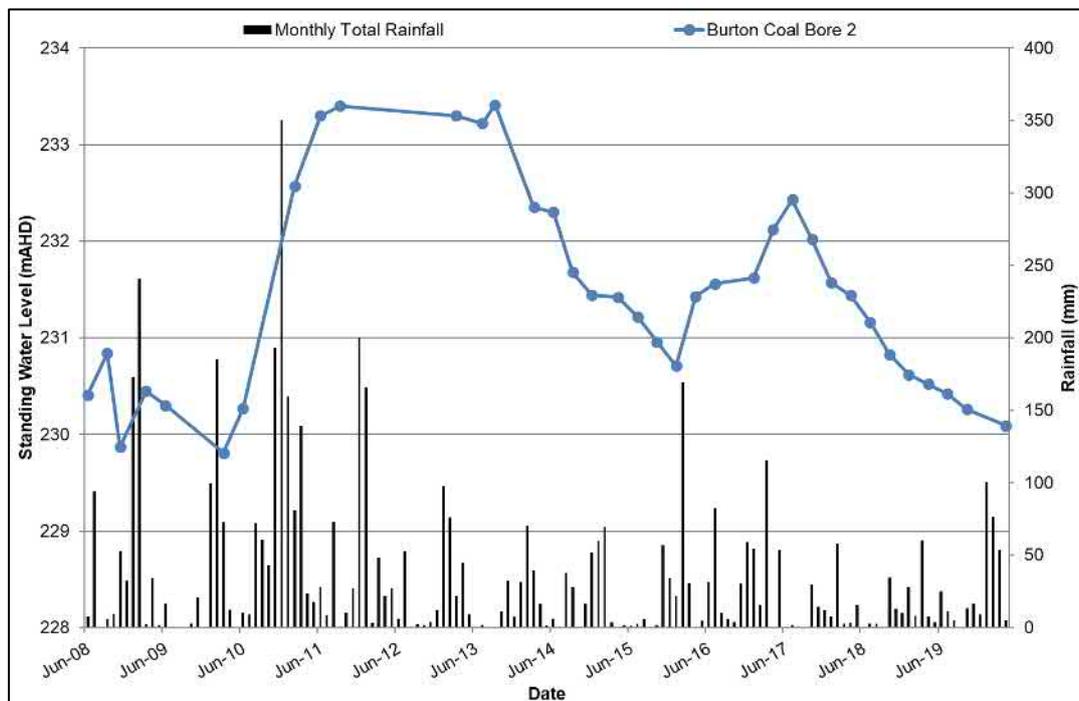
Parameter	Unit	EA Trigger Value	BCB2 April 2020 Value
T - Aluminium	mg/L	0.01	0.07
Chloride	mg/L	1900	2310
Calcium	mg/L	170	193
Total Dissolved Solids	mg/L	3900	4770
Electrical Conductivity	µS/cm	6700	7520
Magnesium	mg/L	230	287

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

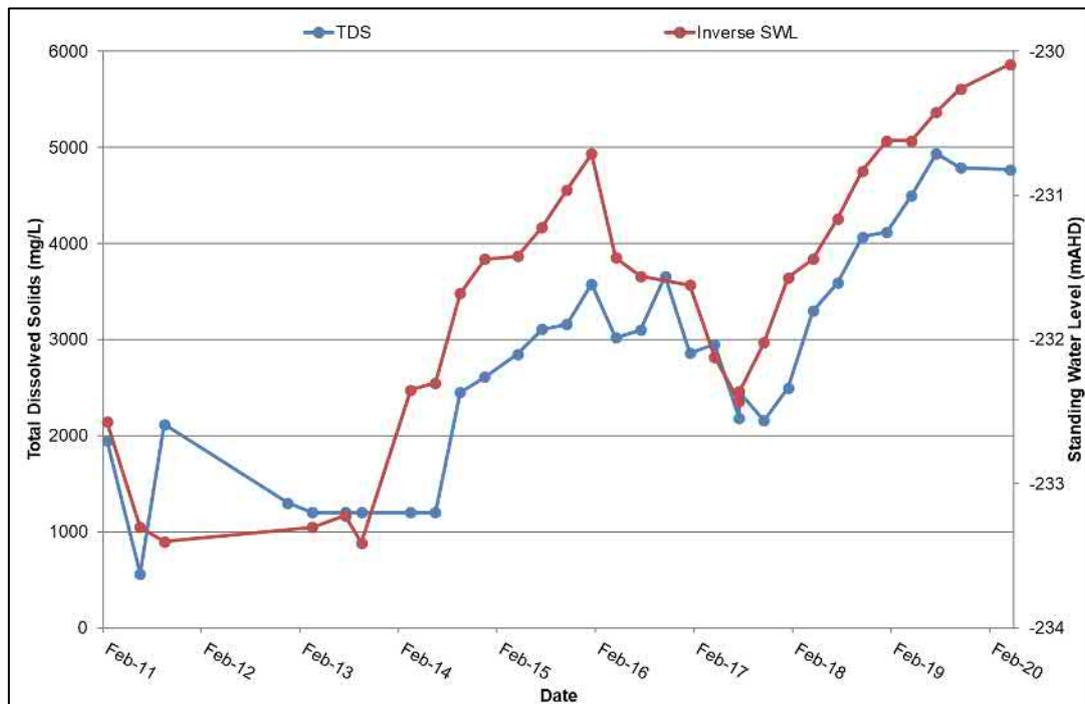


as shallow as 7.26 m below ground level. The combination of deep tree roots and capillary action can draw water from depths, lowering the zone of saturation and concentrating salts.

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.**

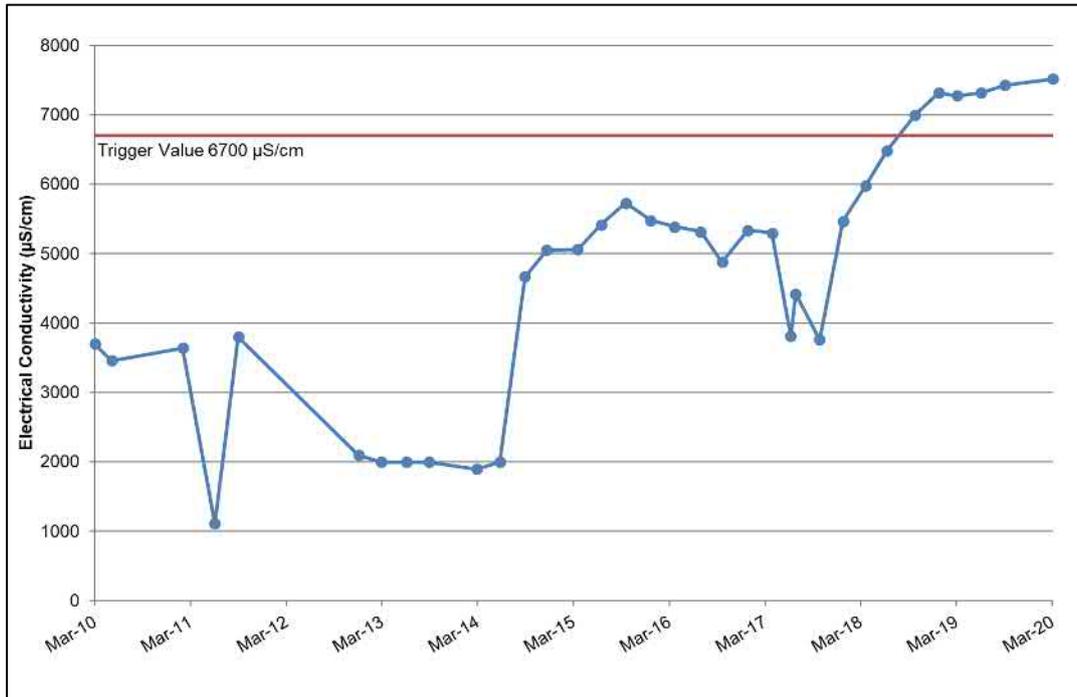


Figure 6: Electrical conductivity in Burton Coal Bore 2.

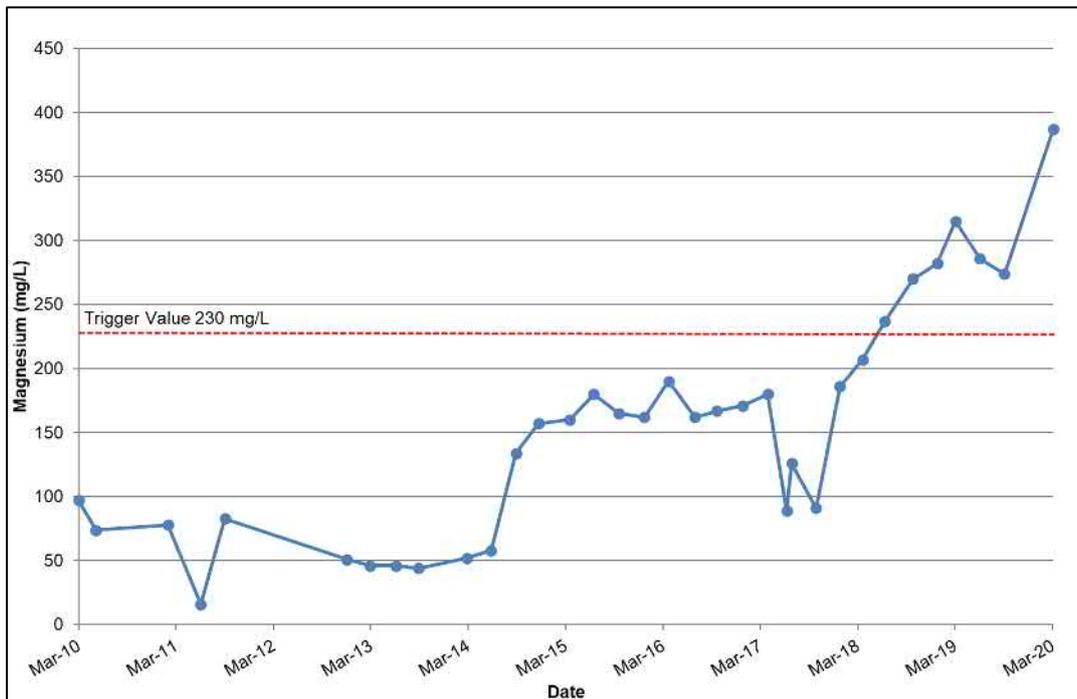


Figure 7: Magnesium in Burton Coal Bore 2.

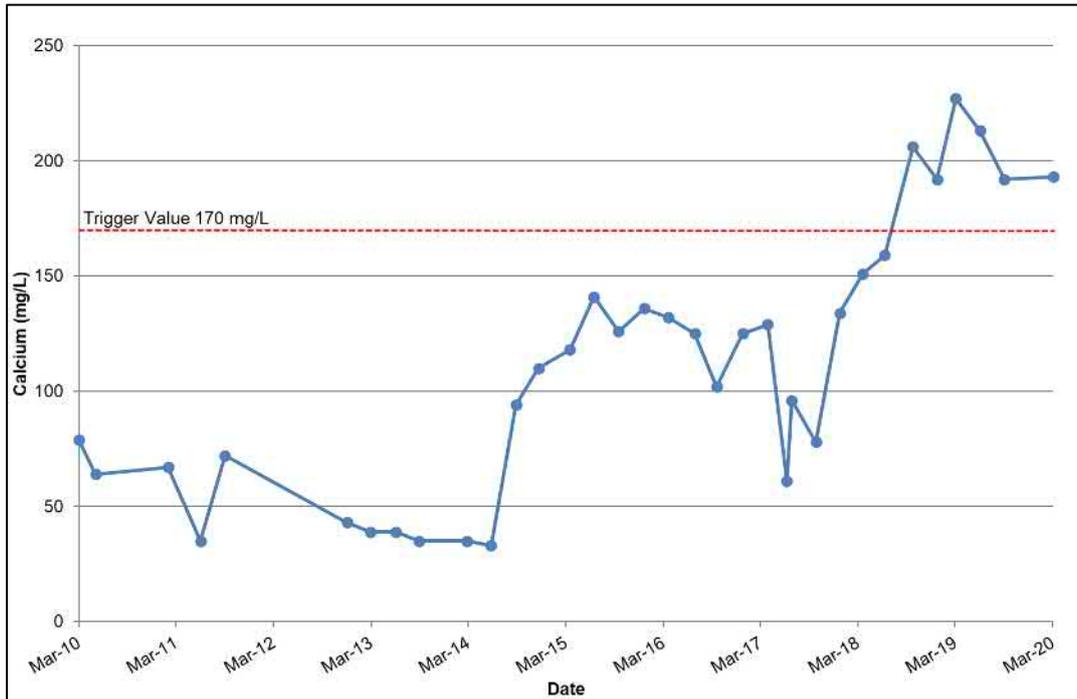


Figure 8: Calcium in Burton Coal Bore 2.

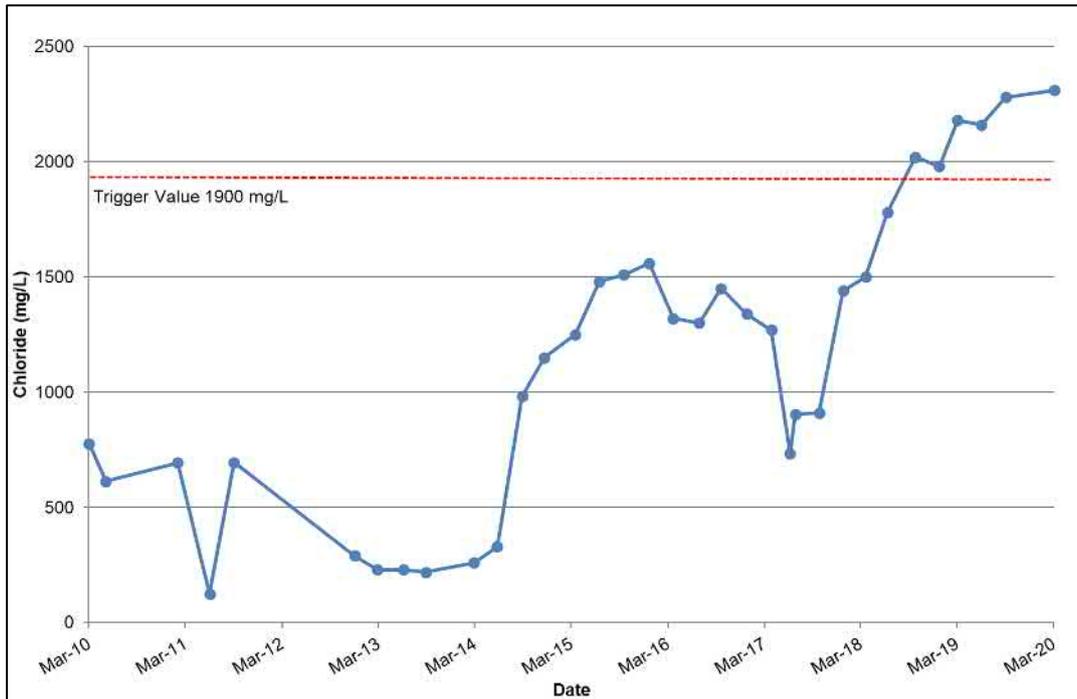


Figure 9: Chloride in Burton Coal Bore 2.



## 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  
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**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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	7.15	7.25	7.30	7.34	7.32	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	8870	7280	18400	3360	7840	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	6370	4500	12700	1840	4550	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	<5	<5	54	<5	30	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	104	100	38	159	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	3130	2180	6530	849	2220	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L		<0.1	0.1	0.1	0.4	0.4
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L		<0.01	0.01	0.03	<0.01	0.04
<b>EN055: Ionic Balance</b>									
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
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
<b>EP080: BTEXN</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	
<b>EA005P: pH by PC Titrator</b>									
pH Value	----	0.01	pH Unit	6.95	7.55	7.45	7.38	7.87	
<b>EA010P: Conductivity by PC Titrator</b>									
Electrical Conductivity @ 25°C	----	1	µS/cm	50800	30200	12000	10800	1890	
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>									
Total Dissolved Solids @180°C	----	10	mg/L	42400	20400	7880	7170	1110	
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>									
Suspended Solids (SS)	----	5	mg/L	1180	1290	133	<5	8	
<b>ED037P: Alkalinity by PC Titrator</b>									
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	
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	918	384	126	<1	91	
<b>ED045G: Chloride by Discrete Analyser</b>									
Chloride	16887-00-6	1	mg/L	19000	10500	4180	3860	255	
<b>ED093F: Dissolved Major Cations</b>									
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	
<b>EG020F: Dissolved Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS</b>									
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	
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	0.3	0.6	0.2	0.1	0.3	
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	0.16	0.26	0.04	0.01	0.07	
<b>EN055: Ionic Balance</b>									
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	
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
<b>EP080: BTEXN</b>									
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	
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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	----	----	----	----
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.30	----	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	8890	----	----	----	----
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	6100	----	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	<5	----	----	----	----
<b>ED037P: Alkalinity by PC Titrator</b>								
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	----	----	----	----
<b>ED041G: Sulfate (Turbidimetric) as SO4 2- by DA</b>								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	122	----	----	----	----
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	3120	----	----	----	----
<b>ED093F: Dissolved Major Cations</b>								
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	----	----	----	----
<b>EG020F: Dissolved Metals by ICP-MS</b>								
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	----	----	----	----
<b>EG020T: Total Metals by ICP-MS</b>								
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	----	----	----	----	----
<b>EG020T: Total Metals by ICP-MS - Continued</b>									
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	<b>0.235</b>	----	----	----	----	----
Molybdenum	7439-98-7	0.001	mg/L	<b>0.001</b>	----	----	----	----	----
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	<b>8.51</b>	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<b>0.26</b>	----	----	----	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EG035T: Total Recoverable Mercury by FIMS</b>									
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	----	----
<b>EK040P: Fluoride by PC Titrator</b>									
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----	----
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>									
Total Phosphorus as P	----	0.01	mg/L	<b>0.02</b>	----	----	----	----	----
<b>EN055: Ionic Balance</b>									
Total Anions	----	0.01	meq/L	<b>91.6</b>	----	----	----	----	----
Total Cations	----	0.01	meq/L	<b>91.9</b>	----	----	----	----	----
Ionic Balance	----	0.01	%	<b>0.16</b>	----	----	----	----	----
<b>EP080/071: Total Petroleum Hydrocarbons</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
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	----	----	----	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued</b>									
<sup>^</sup> >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
<b>EP080: BTEXN</b>									
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	----	----	----	----	----
<sup>^</sup> Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
<sup>^</sup> Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
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
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	66	138
Toluene-D8	2037-26-5	79	120
4-Bromofluorobenzene	460-00-4	74	118

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