

# **Environmental Impact Statement (EIS) Assessment Report for the Washpool Coal Mine Project**

May 2012

Prepared by: Statewide Environmental Assessments, Department of Environment and Heritage Protection

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May 2012

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# 1 Introduction

This report provides an evaluation of the environmental impact statement (EIS) process pursuant to Chapter 3 of the *Environmental Protection Act 1994* (EP Act) for the Washpool Coal Mine Project (Washpool project) proposed by Washpool Coal Pty Ltd.

The former Department of Environment and Resource Management (DERM) and now the Department of Environment and Heritage Protection (EHP), as the administering authority of the EP Act, coordinated the EIS process. This assessment report has been prepared pursuant to sections 58 and 59 of the EP Act. Section 58 of the EP Act lists the criteria that EHP must consider when preparing an EIS assessment report, while section 59 of the Act states what the content must be.

The Act requires that this EIS assessment report must:

- address the adequacy of the EIS in addressing the final terms of reference (TOR)
- address the adequacy of the draft environmental management plan (EM plan)
- make recommendations about the suitability of the project
- recommend any conditions on which any approval required for the project may be given.

In providing the required content this assessment report will summarise key issues associated with the potentially adverse and beneficial environmental, economic and social impacts of the Washpool project. It will discuss the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project. It will also discuss those issues of particular concern that were either not resolved or require specific conditions for the project to proceed.

Chapter 2 of this EIS assessment report outlines the project to provide context for the findings of the report. Chapter 3 outlines the EIS process that has been followed for the Washpool project and the approvals that will be necessary for its commencement. Chapter 4 addresses the adequacy of the EIS, discusses the main issues with regard to the environmental management of the project, and outlines the environmental protection commitments made in the EIS. Chapter 5 of this EIS assessment report assesses the adequacy of the environmental management plan (EM plan) for the project in incorporating the environmental protection commitments, and meeting the content requirements of section 203 of the EP Act. Chapter 6 discusses the suitability of the Washpool project. Chapter 7 comments on the recommendations for conditions to be included in the draft environmental authority (EA).

The giving of this EIS assessment report to the proponent completes the EIS process under the EP Act.

## 2 Project details

Washpool Coal Pty Ltd, a wholly owned subsidiary of Aquila Resources Limited, is the proponent for the Washpool Coal Mine project. The project would involve the development of an open cut pit, mining up to 7.2 million tonnes a year (Mt/y) of run-of-mine (ROM) coal to produce approximately 2.6 Mt/y of coking coal for export. The expected life of the project is approximately 15 to 20 years. The project site is located 260 km west of Rockhampton, 60 km north-east of Emerald and 24 km north-west of Blackwater. Land tenure details of the project are listed below in Table 1.

**Table 1 - Land tenures details for the project**

Lot on RP and mining tenures	Affected area
Lot 6 SP127280 (proposed ML 80164)	Mine pit
Lot 3 SP127278 (proposed ML 80164)	Mine pit
Lot 10 HT401 (proposed ML 80176 & ML 80177)	Light vehicle access
Lot 1 SP231851 (proposed ML 80176 & 80177)	Light vehicle access
Lot A HT523 (proposed ML 80177)	Light vehicle access
Lot D AP10277 (proposed ML 80177)	Light vehicle access
Lot 1 RP615801	Rail Corridor
Lot 5 HT249	Rail Corridor
Lot A HT467	Rail Corridor
Lot 100 SP129829	Rail Corridor

Source: Washpool Coal Mine Project, draft EM plan (February 2012) table 19-1 Land parcels within the project site

The key elements of the project include:

- development of a greenfield open cut coal mine located within proposed mining lease (ML) 80164
- mining would be conducted concurrently in two pits (West and East) that would eventually merge
- development of infrastructure leases that would contain project infrastructure such as an access road and separate 16.5 km rail spur and associated load out facilities
- construction period intended to commence in 2012, initially involving the construction of a site access road and product haul road/rail, water management structures, 66kV power transmission, train load out and additional supporting infrastructure, with first coal being produced in early 2013
- construction of a Coal Handling and Preparation Plant (CHPP), Run of Mine (ROM) and product coal stockpile areas and supporting infrastructure within a Mine Infrastructure Area located south of the mining area
- construction of a raw water dam with raw water supply from Bedford Weir which is managed by SunWater
- construction of an approximately 6 km long levee along the western boundary of the mining area, adjacent to an anabranch of the Mackenzie River, that also contains Coal Mine Lagoon
- development of a purpose built accommodation village preferably located near Blackwater or on the Washpool mining lease
- dry rejects disposal within an initial out-of-pit reject dump, moving to in-pit disposal once space is available
- emplacement of total spoil during the life of the mine of 739 million bank cubic metres (bcm) of which 685.9 million bcm will be placed in pit overburden dumps
- production of approximately 38 Mt of product coal over the 15 to 20 year life of the project
- generation of up to two final voids, totalling about 160 ha within a total mining lease area of 3792 ha.

Coal would be mined initially by truck and electric shovel methods with a view to moving to dragline in the future. ROM coal would be processed at an on-site coal handling and preparation plant.

As part of initial EIS investigations, there were two proposed road route options which were investigated that included:

- road Option A, a new east-west combined light vehicle access road and product haul road from the project site, connecting to Blackwater-Cooroora Road and a train load-out area
- road Option B, a new east-west mine access road from the project site, connecting to Blackwater-Cooroora Road for light vehicles and deliveries (as for Option A) as well as a new internal south-western product haul road from the project site to a train load-out area.

As a result of the EIS identifying air and flooding issues associated with the above transport options, the proponent proposed an alternative transport route for the project. Option B was modified and named Rail Option B1, which became the preferred option for the project to transport coal by rail out of the Washpool Mine Infrastructure Area (MIA) direct to Wiggins Island Coal Export Terminal at Gladstone. Also, Rail Option B1 included an access route to the east for light vehicles and service deliveries (but not for product coal transport).

## 3 The EIS Process

### 3.1 Timeline of the EIS process

On 3 April 2012, *Administrative Arrangements Order (No. 3) 2012* transferred administration of the EP Act from DERM to EHP. All references to DERM in this section relate to the time before the new administrative arrangements took effect.

The EIS process was initiated by Washpool Coal Pty Ltd on 24 November 2009 by application to DERM to prepare a voluntary EIS under section 70 of the EP Act. DERM approved the application to undertake a Voluntary EIS on 27 November 2009.

The proponent submitted draft terms of reference (TOR) for the EIS to DERM on 19 February 2010.

DERM issued a notice of publication of the draft TOR to the proponent on 9 March 2010. DERM placed a public notice announcing the start of the comment period for the draft TOR on its website on 12 March 2010, and advertised in the Courier Mail and the Rockhampton Morning Bulletin on Saturday, 13 March 2010 and in the Central Queensland News on Wednesday, 17 March 2010. The comment period for the draft TOR ran from Monday, 15 March 2010, till close of business on Wednesday, 28 April 2010.

DERM received comments on the draft TOR from thirteen stakeholders within the comment period. These comments, together with those provided by DERM, were forwarded to the proponent on 13 May 2010. DERM considered all comments received on the draft TOR and the proponent's response prior to issuing the final TOR on 1 July 2010.

On 24 December 2010 Sinclair Knight Merz (SKM), the environmental consultants on behalf of the proponent, submitted the EIS to DERM for review. DERM compared the EIS to the final TOR and found that the EIS did not adequately address the TOR in an acceptable form at that time. At the request of the proponent, on the 3 February 2011, DERM issued the proponent with a notice of extension of decision period under section 555 of the EP Act that extended the section 49 decision period under the EP Act until the 4 April 2011. On 11 February, DERM provided the proponent with a list of issues that needed to be addressed before the EIS was resubmitted. The proponent submitted an amended EIS to DERM for review on 31 March 2011. DERM compared the amended EIS with the list of issues and the final TOR and found that further changes, particularly with regard to surface water, were required to the EIS before the public notification stage could commence. A second notice of extension of decision period was issued on 4 April 2011 with the decision period extended until 11 April 2011. On the 5 April 2011, DERM held a meeting with SKM to discuss outstanding surface water issues in the EIS.

On the 8 April 2011, SKM submitted an amended EIS to DERM containing additional surface water information. DERM compared the amended EIS with the final TOR and found that the EIS adequately addressed the final TOR. On 11 April 2011, DERM decided that the EIS was suitable to proceed to the notification stage and on 20 April 2011 issued a notice of that decision to the proponent. The period for the making of submissions about the EIS was set at 30 business days starting on Monday, 9 May 2011, and continuing until close of business on Monday, 20 June 2011.

DERM placed a public notice announcing the start of the submission period for the EIS on its website on 6 May 2011, and in the Courier-Mail, Rockhampton Morning Bulletin and Emerald Central Queensland News on Saturday 7 May 2011. The proponent also gave a copy of the EIS notice to each affected and each interested person for the project.

DERM received twenty submissions about the submitted EIS within the submission period. Also, after the close of the submission period, DERM received an additional two submissions about the submitted EIS from an environmental interest group and from the Central Highlands Regional Council. All twenty two submissions were accepted in accordance with section 55 of the EP Act. The submissions, together with a submission from DERM were forwarded to the proponent on 4 July 2011 for consideration and response.

The proponent's response to submissions was initially due on 28 July 2011. However, the proponent requested, and was granted, two extensions until 29 August 2011 and then 26 September 2011 to the period in which they were required to provide the response. A response to submissions was received by EHP on 29 August 2011 that



included an emended draft EM plan but was not accompanied by the amendments to the EIS, as required by section 56 of the EP Act.

Even though the response to submissions (August 2011) was not complete, on 30 August 2011 copies of the received response and amended draft EM plan were distributed to those entities that had provided submissions on the EIS. DERM received eleven submissions on the proponent's response to submissions (August 2011) that included five from State government departments, four from non-government organisations, one from a regional Council and one from the Commonwealth Department of Sustainability, Environment, Water, Population and Communities (SEWPaC).

On 20 October 2011, DERM held a meeting with the proponent to discuss the statutory requirements under section 56 of the EP Act for providing amendments to the EIS, as well as outstanding issues with ground water, surface water and the draft EM plan. In order to address outstanding issues with the EIS so that DERM could make a decision whether to proceed with the EIS, on the 21 October 2011, the proponent requested, and was granted, extensions until the 12 December 2011 to the period in which they were required to provide a response to submissions. On 24 October 2011, DERM issued the proponent with a notice of extension of decision period, and attached the submissions received on the response to submissions.

On 1 November 2011, a submission from DERM on the response to submissions (August 2011) was forwarded to the proponent for their consideration. On 2 December 2011, the proponent requested and was granted another extension until the 10 February 2011 to the period in which to provide a response to submissions.

The proponent's second response to submissions, which included an EIS Addendum and an amended draft EM plan, was received by DERM on 20 January 2012. Copies of the response to submissions and EIS Addendum were sent to the respondents who commented on the first response to submissions.

DERM received eleven submissions on the EIS Addendum dated 20 January 2012, including five from State government departments, three from non-government organisations, one from SEWPaC and two from landholders. On 9 February 2012, DERM held a meeting to discuss still outstanding issues related to groundwater, surface water and the draft EM plan that the EIS Addendum had not adequately addressed. On the 10 February 2012, the proponent requested and was granted an extension until 9 March 2012 to the period in which to provide a response to submissions.

The proponent's third response to submissions included an EIS Addendum and an amended draft EM plan was received by DERM on 24 February 2012. Copies of the response to submissions, EIS Addendum and amended draft EM plan were sent to the respondents who commented on the EIS Addendum dated 20 January 2012.

DERM received eight submissions of the EIS Addendum dated 24 February 2012 that included three from State government departments, three from non-government organisations, one from SEWPaC and one from a landholder. The submissions on the EIS Addendum (February 2012) were forwarded to the proponent for their consideration.

On 9 March 2012, DERM decided under s56A of the EP Act that the submitted EIS should proceed under Division 5 (EIS assessment report) and Division 6 (Completion of process) of the EP Act. A notice of the decision to allow the submitted EIS to proceed was issued to the proponent on 23 March 2012.

EHP, in the preparation of this assessment report, considered submissions and comments from members of the advisory body (see section 3.3.2 for advisory body constituents).

## 3.2 Approvals

The Washpool project will require a mining lease for the mining infrastructure area, for the product coal transport corridor and for the access route to the east for light vehicles and service vehicles.

Also, the project will require an environmental authority (EA) under Chapter 5 of the EP Act. The EA will cover the environmental management of the project and address the following activities that are directly associated with, or facilitate or support, the mining activities, and which would otherwise require approval under the *Sustainable Planning Act 2009*:

- ERA 8(c) - Chemical storage
- ERA 63(b)(i) - Sewage treatment

## 3.3 Consultation program

### 3.3.1 Public consultation

In addition to the statutory requirements for advertising of the TOR and EIS notices and the mailing of the notices to interested and affected parties, the proponent undertook community consultation with members of the public and other stakeholders during the public submission period of the EIS.

### 3.3.2 Advisory Body

DERM invited the following organisations to assist in the development of the TOR and assessment of the EIS by participating as members of the advisory body for the Washpool Coal Mine project:

- Capricorn Conservation Council
- Central Highlands Regional Council
- Commonwealth Department Sustainability, Environment, Water, Population & Communities
- Department of Communities
- Department of Community Safety
- Department of Education and Training
- Department of Employment, Economic Development and Innovation (DEEDI)
- Department of Infrastructure and Planning
- Department of Transport and Main Roads
- Fitzroy Basin Association
- North Queensland Land Council Native Title Representative Body Aboriginal Corporation
- Queensland Health
- Queensland Police Service
- Queensland Rail
- Queensland Treasury

An advisory body briefing for the project was held in Brisbane on 19 May 2011 and at Blackwater on 31 May 2011 during the notification stage of the EIS. Also on 31 May 2011, advisory body members attended a field trip to inspect the project site.

Due to machinery of government changes on 21 February 2011 (see Public Service Department Arrangements Notice No.1 2011), changes occurred to a number of Queensland Government departments. Consequently, the functions of the Coordinator-General in the Department of Infrastructure and Planning (DIP) was transferred to the Department of Employment, Economic Development and Innovation. Also the Planning Section of DIP became the Department of Local Government and Planning.

### 3.3.3 Public notification

In accordance with the statutory requirements, advertisements were placed in *The Courier-Mail*, *Rockhampton Morning Bulletin*, and *Central Queensland News* to notify the availability of the draft TOR and EIS for review and public comment as stated in section 3.1 of this EIS assessment report. In addition, notices advising the availability of the draft TOR and submitted EIS for public comment were displayed on the DERM website.

The draft TOR and submitted EIS were placed on public display at the following locations during their respective public comment and submission periods:

- DERM website (draft TOR only)
- DERM office, 99 Hospital Road, Emerald
- Blackwater Library, Wey Street, Blackwater
- Aquila Resources Limited, 10 Eagle Street, Brisbane

## 3.4 Matters considered in the EIS assessment report

Section 58 of the EP Act requires, when preparing this EIS assessment report, the consideration of the following matters:

- the final TOR for the EIS
- the submitted EIS
- all properly made submissions and any other submissions accepted by the chief executive
- the standard criteria
- another matter prescribed under a regulation.

These matters are addressed in the following subsections.

### 3.4.1 The final TOR

The final TOR document, issued on 1 July 2011, were considered when preparing this EIS assessment report. While the TOR were written to include all the major issues associated with the project that were required to be addressed in the EIS, they were not exhaustive, nor were they intended to exclude all other matters from consideration.

Where matters outside of those listed in the final TOR were addressed in the EIS, those matters have been considered when preparing this EIS assessment report.

### 3.4.2 The submitted EIS

The “submitted EIS” was considered when preparing this EIS assessment report. The “submitted EIS” comprised:

- the EIS that was made available for public submissions on 9 May 2011
- the response to submissions and amended draft TOR received by DERM on 29 August 2011
- the response to submissions including EIS Addendum and an amended draft EM plan received by DERM on 20 January 2012.
- the response to submissions including EIS Addendum and an amended draft EM plan received by DERM on 24 February 2012.

### 3.4.3 Properly made submissions

DERM received twenty submissions on the submitted EIS within the submission period and two submissions after the submission period ended. All twenty two of the submissions were accepted under section 55 of the EP Act. Those submissions were received from the following stakeholders:

- Blackwater State High School
- Brett Christie
- Capricorn Conservation Council
- Central Highlands Regional Council
- Department of Communities
- Department of Community Safety
- Department of Employment, Economic Development and Innovation
- Department of Sustainability, Environment, Water, Population and Communities
- Department of Transport and Main Roads
- Fitzroy Basin Association
- Greg Kruger
- Ken O'Dowd, Federal Member for Flynn
- Kev Cracknell, Blackwater Community Progress Group

- Murray Haigh
- Queensland Police Service
- Rees R & Sydney Jones, Solicitors - Submission of Barry and Ainsley Galloway
- Rees R & Sydney Jones, Solicitors - Submission of DR, RM, ST & WR Dixon as Personal Representatives and ST Dixon
- Road Accident Action Group
- Scott Galloway
- Vaughan Johnson, MP, Member for Gregory
- Wesfarmers Resources
- WR & ST Dixon

DERM provided its own submission on the EIS to the proponent.

In addition, there has been correspondence from stakeholders regarding the proponent's response to submissions on the EIS and supplementary information. All submissions and other comments made by stakeholders on the EIS documents were considered when preparing this EIS assessment report.

### **3.4.4 The standard criteria**

Section 58 of the EP Act requires that, among other matters, the standard criteria listed in Schedule 3 of the EP Act must be considered when preparing the EIS assessment report. The standard criteria are:

- (a) the principles of ecologically sustainable development as set out in the National Strategy for Ecologically Sustainable Development; and
- (b) any applicable environmental protection policy; and
- (c) any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and
- (d) any applicable environmental impact study, assessment or report; and
- (e) the character, resilience and values of the receiving environment; and
- (f) all submissions made by the applicant and submitters; and
- (g) the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—
  - (i) an environmental authority;
  - (ii) a transitional environmental program;
  - (iii) an environmental protection order;
  - (iv) a disposal permit;
  - (v) a development approval; and
- (h) the financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument; and
  - (i) the public interest; and
  - (j) any applicable site management plan; and
  - (k) any relevant integrated environmental management system or proposed integrated environmental management system; and
  - (l) any other matter prescribed under a regulation.

EHP has considered the standard criteria when preparing this EIS assessment report.

### 3.4.5 Prescribed matters

In addition, section 58 of the EP Act requires that the following prescribed matters, under the Environmental Protection Regulation 2008, are considered when making an environmental management decision for this project:

- section 51, matters to be considered for environmental management decisions
- section 52, conditions to be considered for environmental management decisions
- section 53, matters to be considered for decisions imposing monitoring conditions
- section 55, release of water or waste to land
- section 56, release of water, other than stormwater, to surface water
- section 57, release of stormwater
- section 60, activity involving storing or moving bulk material
- section 62, activity involving acid-producing rock
- section 64, activity involving indirect release of contaminants to groundwater.

### 3.4.6 Environment Protection and Biodiversity Conservation Act 1999

On 9 December 2009, the Washpool project was referred (EPBC 2009/5240) to the (then) Commonwealth Department of Environment, Water, Heritage and Arts (DEWHA) for consideration under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). On 16 February 2010, DEWHA decided that the Washpool project was a controlled action and the controlling provisions are sections 18 and 18A (Listed threatened species and ecological communities) of the EPBC Act. The State's EIS process was accredited for the assessment under Part 8 of the EPBC Act in accordance with the Bilateral Agreement between the Commonwealth of Australia and the State of Queensland (2009). The then DEWHA and now the Commonwealth Department of Sustainability, Environment, Water, Population & Communities (SEWPaC) was included as an advisory body for the Washpool project and commented on the draft TOR and the submitted EIS.

This EIS assessment report is required to contain enough information about the relevant impacts of the action and the proposed mitigation measures for the Commonwealth Environment Minister to make an informed decision on whether or not to approve the taking of the action pursuant to provisions of the EPBC Act.

A copy of this EIS Assessment Report will be given to the Commonwealth Environment Minister for consideration when deciding, under section 133 of the EPBC Act, whether to approve the taking of the action. Matters of national environmental significance are discussed in section 4.13 of this EIS assessment report.

## 4 Adequacy of the EIS in addressing the final TOR

Table 2 lists the main aspects of the Washpool project addressed in the submitted EIS and highlights the significant issues associated with those aspects. The table notes whether the submitted EIS adequately addressed the matters described in the final TOR. The subsections of this chapter enlarge on some of those significant issues, discuss the findings of the EIS in regard to them and outline the environmental protection commitments made by the proponent.

**Table 2 - Summary of the adequacy of the submitted EIS in addressing the final TOR**

Matters included in the final TOR	Significant issues	Were issues adequately addressed in the submitted EIS?
Introduction	Overview of the project, its objectives and scope. Outline of the necessary approvals and their assessment processes.	Yes to both.
Project need and alternatives	Project justification and any alternatives.	Yes
Project description	Location of the project in the regional and local contexts. Description of the construction phase of the project. Description of the operational phase of the project.	Yes to all.

Climate	Climatic conditions at the site	Yes
Land	Topography & geomorphology Geology Mineral resources Soils Land contamination Land use Existing infrastructure Sensitive environmental values Landscape character and visual amenity.	Yes to all except geology
Transport	Transportation of personnel by road. Impacts on air traffic of fly-in, fly-out workforce. Transportation of ore concentrates by road.	Yes to all.
Waste	Waste Waste rock characterisation Regulated and other waste	Yes to all.
Water resources	Surface watercourses and overland flow Groundwater	No to both
Air quality	Dust Greenhouse gases Other air emissions	Yes to all.
Noise and vibration	Noise at sensitive receptors Noise impacts on wildlife Vibration due to blasting	Yes to all.
Nature conservation	Terrestrial plants Terrestrial animals Aquatic ecology Groundwater dependent ecosystems	Yes to all.
Cultural heritage	Indigenous cultural heritage Non-indigenous cultural heritage	Yes to both.
Social issues	Impacts on local community, housing and services Impacts due to fly-in, fly-out workforce	Yes to both.
Health and safety	Air and water emissions. Road haulage, and traffic regimes	Yes to both.
Economy	Alienation of grazing land Effects on the local and regional economy Effects on the State economy	Yes to all.
Hazard and risk	Unplanned discharges to air, water or land Transportation, storage and use of hazardous substances Emergency response	Yes to all.
Rehabilitation	Rehabilitation of areas affected by mining activities	Yes

## 4.1 Introduction

The EIS provided an adequate introduction to the Washpool project, its objectives and scope. It adequately identified the necessary approvals required for the project and outlined the assessment and approval processes.

## 4.2 Project need and alternatives

The EIS adequately described the need for the project, and briefly outlined the social, economic and environmental benefits and costs, which were addressed in more detail in later sections of the EIS.

This section briefly discussed a number of options that were considered for the project, including:

- methods for the removal of overburden above the coal deposit, with truck and shovel being the selected option, though a dragline may be considered in the future
- waste management processes for the CHPP with the preferred option being the dry disposal of rejects within in-pit dumps
- transporting product coal to the rail transport system, with the preferred option being the rail out from product stockpile in close vicinity to the CHPP
- connecting the project to electrical power, with the selected option being an overhead 66 kV transmission line from the Bedford Weir substation
- water supply, with the preferred option being water sourced from Bedford weir and purchased from an existing allocation
- final voids, with progressive backfilling of most of the pits being the preferred option.

## 4.3 Project description

The EIS adequately described the location, scope and phases of the project. An outline of the project is provided in section 2 of this report.

## 4.4 Climate

The EIS adequately described the local climate with regard to how the climate could affect the potential for environmental impacts and the management of operations at the site.

The climate of the area is monsoonal, with relatively dry winters and wet summers. The monthly rainfall averages are 84 mm between December and February and 35 mm between April and September. The project area has warm days during summer with average daytime temperatures around 34°C, falling to 23°C during the winter months. The winds are predominantly from the east.

## 4.5 Land

The final EIS adequately described those aspects of the site and project related to the existing and proposed qualities and characteristics of the land except with regard to geology. The following subsections address those qualities and characteristics in more detail.

### 4.5.1 Land disturbance

Key features of land disturbance for the project include:

- three out-of-pit overburden dumps that would reach a maximum height of about 40 m above the natural ground level with a total footprint of approximately 273 ha and with a total volume of about 21.5 million bank cubic metres<sup>1</sup> (bcm)
- a run of mine (ROM) pad, being approximately 16 ha in area
- a levee approximately 6 km long, 6.9 m high and 30 m wide along the western boundary of the mining area
- two contiguous, backfilled pits that would have a total area of approximately 1329 ha, a total volume of about 685.9 million bcm, and an elevation up to approximately 30 m above the pre-mining, natural surface
- two final voids about 35 m deep with a total area of about 163 ha, which would be situated above the probable maximum flood level

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<sup>1</sup> Bank cubic metres represents the volume of rock in the ground before it is excavated.

Rehabilitation of the disturbed land is addressed in detail in section 4.19 of this assessment report.

## 4.5.2 Land use

The main land use within the project area is cattle grazing, while an area of cropping is present to the south west of the site. Cattle grazing is the predominant land use surrounding the project site. However, some cropping land is present to the south west of the project area. Other areas of cropping and irrigated cropping are present on the northern bank of the Mackenzie River near Bedford Weir.

There are a number of coal mines in the vicinity of the project including:

- Curragh Mine approximately 5 km to the east
- Blackwater Mine about 18 km to the south
- Ensham Mine about 20 km to the west.

Blackwater is the closest major town to the project located approximately 24 km to the south east, while Emerald is about 60 km to the west. Other smaller townships and residential areas in the region include Bluff (approximately 32 km to the southeast), Comet (approximately 26 km to the southwest), Yamala (approximately 40 km west southwest) and Lilyvale (approximately 30 km to the northwest). All those residential areas are too distant to be directly affected by mining activities of the Washpool project.

The Bedford Weir on the Mackenzie River is located 6 km to the east of the project, and land adjacent to the south bank is used for recreation. The Taunton National Park is located approximately 40 km east of the project, while the Blackdown Tableland National Park is about 35 km to the south east.

## 4.5.3 Geology

The EIS stated that the project is located in the Permo-Triassic Bowen Basin. The Washpool deposit overlays the north-eastern flank of a regional-scale antiform mapped as the Comet Ridge within the Burngrove Formation.

The TOR required the proponent to provide a map and a series of cross sections of the geology of the project area. However, despite reporting that 266 exploration holes had been drilled, and after repeated requests from the former DERM, the proponent only provided two inconsistent regional maps published by the Queensland Department of Mines and Energy and CSIRO, and two cross sections, one east-west across the whole site, and one partial cross section in the north-south direction of the northern part of the site.

A detailed, fully illustrated description of the geology of the site based on drill logs is an essential part of the necessary information for the assessment of groundwater impacts. As the description and illustration of geology in the EIS were inadequate, the assessment of groundwater impacts could not be fully completed (see section 4.8.3 of this report).

It will be necessary for the proponent to provide an adequate fully illustrated description of the geology of the site, based on the 266 core logs, in a revised EM plan, and to use that description in an updated assessment of potential groundwater impacts.

## 4.5.4 Soils and land suitability

The proponent undertook a soil survey that comprised a total of 170 sampling sites, including 83 detailed soil profile descriptions, within the proposed ML80164 and a further 16 sites along each of the proposed transport corridors for the mine access road and rail spur. The EIS stated that soils were mapped in general accordance with guidelines provided in the *Australian Soil and Survey Handbook* (Gunn et al, 1988).

The EIS stated that the soil survey conducted for the mining area, identified seven different soil types:

- moderately deep greyish brown sandy duplex
- gilgai on dark grey brown clays
- alluvial clay plains of dark cracking clays
- brown to dark grey cracking clays with strong surface granular mulch and well structured subsoils
- shallow, gravelly red brown sandy clays
- red earths on elevated rises along undulating plains



- gravelly coarse sandy loams.

The EIS stated that the topsoil resources present in the project area should be more than adequate for the rehabilitation of the waste rock dumps and other disturbed areas. The recommended topsoil stripping depths for each soil type was provided in the EIS. The proponent makes a commitment in the draft EM plan to develop a Topsoil Management Plan three months prior to the commencement of construction to ensure the appropriate identification, stripping, storage, stabilisation and reuse of top soil across the project area.

The EIS discussed the erosion susceptibility of each soil type in the project area. The EIS stated that most soil types are susceptible to erosion if exposed, and the erosion extent increases with the undulating nature of the terrain. In the draft EM plan the proponent makes a commitment that any sodic or dispersive materials will not be placed near the surface of the spoil dumps or within the plant root zone.

The draft EM plan contained adequate sediment and erosion control strategies to be implemented, including:

- all areas of disturbance on site will be kept to an operational minimum and controlled by strict clearance protocols, involving detailed mine planning within pit areas and a 'permit to disturb' system for the rest of the site
- progressive rehabilitation will be conducted to help keep exposed areas to an operational minimum
- bed and bank stability will be managed to minimise erosion and reduce sedimentation
- machinery will be appropriately selected for each activity to maximise efficiency and minimise site disturbance
- contour ripping will be carried out immediately after topsoil placement to maximise rainfall infiltration and minimise the potential for erosion by runoff
- topsoil will be salvaged for use in rehabilitation
- water management structures will be appropriately protected to prevent scouring, particularly in areas of potential high or concentrated flow (e.g. drains, spillways, etc.)
- traffic will be confined to maintained tracks and roads
- a final land use and rehabilitation plan (FLURP) will be developed and implemented
- water management structures (e.g. dams, waterways, diversion banks, etc.) will be installed and upgraded as necessary to adequately manage and control water quality and quantity on the Project site
- water management structures constructed at the project site will be frequently inspected on a monthly basis and after rainfall events and maintenance undertaken when required.

The proponent committed to developing an erosion and sediment control plan to implement the strategies. The plan will be developed prior to construction commencing.

The EIS assessed the suitability and major limiting factors of each soil type for irrigated cotton, sorghum and wheat using the guidelines of Forster and Sugars (2000). The EIS stated that the only soil type along the floodplain with potential for irrigation is the alluvial clays which are assessed as class 3 for irrigation use.

The EIS stated that the soil field surveys were undertaken in accordance with *The Planning Guidelines: The Identification of Good Quality Agricultural Land* (DLGP and DPI, 1993). The EIS stated that most of the proposed mining area forms part of Good Quality Agricultural Land (QGAL), Class C1 and C2 grazing in addition to an area of class B marginal cropping land.

The former DERM advised the proponent of a number of issues with the soil assessment in the first version of the EIS, including:

- not satisfactorily addressing the assessment of the soils for their suitability with respect to Good Quality Agricultural Land
- a soil assessment was not undertaken of the transport corridors as required by the TOR.

In response to the above soils issues, the proponent provided an adequate response that included:

- clarification in the soil assessment of the suitability and major limiting factors of each soil type for furrow, overhead spray and trickle irrigation assessed using the guidelines of Forster and Sugars (2000)

- additional soil sampling and analysis of the transport corridors, which found the soils generally consistent with the soil groups as mapped by CSIRO in the Atlas of Australian Soils.

#### **4.5.5 Strategic cropping land (SCL)**

In December 2011, the *Strategic Cropping Land Act 2011* (SCL Act) and the Strategic Cropping Land Regulation 2011 were approved by the Governor in Council. This legislation requires proposed development that may impact on Queensland's best cropping land to be assessed to ensure it does not cause permanent sterilisation of this land. The former DERM provided comments to the proponent requesting them to address the requirements of the SCL Act.

In the EIS Addendum dated February 2012, the proponent acknowledged that the road transport corridor does traverse areas that may be classed as suitable for irrigated cropping. The construction of a bitumen access road is not authorised under the Strategic Cropping Land – Standard conditions code for resource activities, meaning that the impact of the road on the potential SCL is not deemed to be “temporary and low risk”. The proponent proposed adequate measures to minimise the impact of the road in accordance with the intent of the legislation, including:

- the road will be constructed on top of the existing soil profile to facilitate drainage and to avoid excavation of any potential SCL
- raw materials used for the road including sand, gravel and clays will be imported from the project area within the proposed ML80164, with adequate sediment and erosion control measures in place
- at mine closure, all materials used for the road will be removed and the underlying soil will be ripped to return its compaction level to that of the adjacent undisturbed soils
- the soil surface of the rehabilitated road will be recontoured and revegetated to protect against erosion.

The proponent states that an application form, 'Strategic cropping land protection decision under section 95 of the *Strategic Cropping Land Act 2011*' will be lodged with EHP for consideration. Under the SCL Act, EHP is unable to issue the EA for the project until all requirements for strategic cropping land have been met.

#### **4.5.6 Resource utilisation**

The EIS adequately addressed resource utilisation for the project.

The Washpool project would be targeting the Scorpio seam of the Burngrove Formation, which is the principal economic coal resource in the Washpool deposit.

The EIS described the Washpool coal deposit as a well defined resource being a perched, synclinal (i.e. basin shaped) deposit. While the resource extended to the west of Coal Mine Lagoon, to the extent of potentially yielding about 1.7 million tonnes of product coal, the proponent has decided not to mine in that area. This decision does not preclude the utilisation of this resource at a later date should the costs of building water course diversions be more cost effective for the project. However, at the time of this EIS, this is not planned for the duration of the project.

The proponent has drilled seven boreholes into the Scorpio seam and taken gas samples from these boreholes. The EIS stated that CSG Services has undertaken desorption and gas composition testing on the gas samples as per Australian Standard 3999:1990. The gas analysis has concluded that no commercial coal seam gas will be liberated from the Scorpio seam during the proposed mining operations at the project site.

#### **4.5.7 Land contamination**

A desktop study was undertaken to identify, where possible, sites within the project area with the potential for contamination and included a review of the following:

- Environmental Management Register (EMR) and Contaminated Land Register (CLR) data from the former DERM
- the potential of any residual unexploded ordnances (UXO)
- aerial photography of the project site and transport corridors.

The EIS stated that no land parcels from the project area, including areas intersected by the transport corridors, were listed on the EMR and/or CLR.

The EIS stated that no potential for UXO was identified within the project area from the Defence website page. The review of aerial photography identified locations of potentially contaminated sites that are presented in Table 3.

**Table 3 - Summary of site contamination review**

Land Parcel	Listed on EMR/CLR	Potential Notifiable Activity	Location
Lot 6 Plan SP127280	No	Livestock dip or spray race	Within proposed ML 80164
Lot 10 HT401	No	Chemical storage/Petroleum product or oil storage/Septic tank	Outside the proposed ML 80164 and mine access road
Lot 6 Plan HT571	No	Hazardous contaminants (railway)	Outside of mine access road corridor
Lot 2 Plan HT500	No	Hazardous contaminants (railway)	Intersected by Rail Option B1 spur

Source: Washpool Coal Mine Project, EIS Addendum (February 2012) table 4-16 Summary of site contamination review

The proponent stated that a cattle dip on lot 6 Plan SP127280 is situated on the north-western edge of the out-of-pit dump and noted that, if possible, the cattle dip will be avoided during the detailed design of the mine. However, should the cattle dip be impacted by the project, a phase 1 and 2 assessment will be carried out of the cattle dip area in accordance with the *Draft Guidelines for the Assessment and Management of Contaminated Land* (Queensland Department of Environment, May 1998) and managed in accordance with the outcome of this assessment.

The proponent anticipates that there would be other notifiable activities carried out within the proposed ML boundary during the life of the project, including:

- 14. Engine reconditioning
- 24. Mine wastes.

EHP will require the locations of notifiable activities carried out at the project site to be provided for entry onto the EMR.

The proposed mining activities will potentially result in some contamination of land. The EIS proposed a range of satisfactory mitigation measures to reduce the potential negative impacts to land and waters from operational activities, including accidental spills of hydrocarbons and chemicals.

The draft EM plan contained an adequate commitment that during the decommissioning phase, the proponent will ensure all notifiable activities conducted within the project boundaries will be investigated for in-situ soil contamination, as required under the EP Act, and will either:

- be released from EHP's EMR
- be remediated, confirmed by follow-up investigation(s), and released from EHP's EMR, or
- remain on EHP's EMR with an agreed site management plan.

#### 4.5.8 Landscape character and visual amenity

Through the clearing of vegetation and the excavation of the mining areas, the project would alter the visual characteristics of the site from the start, and the landscape would continue to change over the life of the mining operations. The topography of the project would also be altered over time, through the placement of spoil external to the proposed mine pits.

Throughout the establishment, operation and decommissioning of the project, aspects that would be most visible from nearby include:

- out of pit spoil dumps
- mine pits and voids located close to the boundaries of the mining lease area

- the MIA, including the CHPP; administrative buildings, workshops, warehouses, explosives stores and fuel storages; access roads and rail line.

The proponent stated that in its initial stages, the project would be a visually prominent feature within the landscape and would create some conflict with the existing nature of the visual environment. The nature of the project works will initially alter the existing visual environment through excavation of a predominantly rural landscape. However, the proponent claims that over time the project would generate a visual impact similar to existing operations of the nearby mines. The establishment of visual buffers around the project site, particularly along the site boundaries or near sensitive receptors, would help limit views of the project.

The EIS stated that after mining operations cease, the out-of-pit spoil dumps and remnant voids would be contoured and revegetated sufficiently to enable the restoration of the land. In the long-term, it is expected that impacts from the project on the visual landscape would be minimal as the peaks and dips associated with the out-of-pit spoil dumps and the remnant voids would be similar to the undulating topography that is common throughout the broader, regional landscape.

## 4.6 Transport

The EIS assessed the potential construction and operational traffic impacts from the Washpool project that included:

- increased light and heavy vehicle movements on the existing road network associated with the construction and operational project workforce
- coal haulage trucks travelling on a new internal project haul road
- materials supply during the construction and operational phases
- upgrading of new and existing intersections
- coal freight traffic on the existing QR National line.

Two potential transport corridors have been assessed in detail in the EIS. The traffic assessment determined that for both options, including the construction and operation phases, are not expected to have a significant impact on the surrounding road network. During construction, a Road Use Management Plan (RMP) will be required for all works conducted on the road reserve. A Traffic Management Plan will also be required for Yackman Road if it is used for temporary access during the initial construction period. As the level of service of the existing roads would not be affected by the operation of the mining project, a Traffic Management Plan is not considered necessary for the operational phase.

Other recommended road mitigation measures in the EIS include appropriate consultation with the community and authorities, maintenance of safe access to properties, exploring of provision of a regional bus service for mine employees, changes and detailed design of the intersection between the mine access road and the regional road network.

The proponent stated that the project has secured appropriate port and rail capacity through the Wiggins Island Coal Export Terminal and Queensland Rail National.

The Department of Transport and Main Roads (DTMR) raised a number of transport issues during the EIS process which were dealt with by the proponent in the two EIS Addendums (January and February 2012). DTMR has advised that the proponent has responded to most of the DTMR's concerns. The remaining transport issues raised by DTMR should be addressed by the proponent during the detailed design phase of the project.

DTMR advised the proponent of the following road related requirements for the project.

### **Finalised Road Impact Assessment and Road-use Management Plan**

No later than six months prior to the commencement of any Significant Project Traffic; the proponent must:

- Review and finalise the road impact assessment (RIA) to include details of the latest project traffic generation and all project traffic impacts on the safety and efficiency of State controlled roads in accordance with DTMR's Guidelines for Assessment of Road Impacts of Development (2006), in consultation with the Manager, Corridor Management & Operation (CM&O) or the delegate of DTMR's Fitzroy Regional Office; then submit the updated RIA to the Manager, CM&O or their delegate for review and approval.

- Prepare a RMP for all use of State-controlled roads for each phase of the project in consultation with the Manager, CM&O or their delegate, who will advise on RMP requirements. The RMP must receive DTMR's approval prior to its implementation and must include:
  - road-use management strategies to minimise and manage project traffic impacts on the State-controlled road network
  - a summary of the latest traffic generation, finalised assessment of impacts on road safety and efficiency and other updated impact mitigation strategies such as any road maintenance or necessary improvements.

#### **Required upgrades in accordance with the EIS findings**

In accordance with the findings of Chapter 5 of the EIS: Transport and Infrastructure, prior to the commencement of any use of Yackam Road by construction traffic for the project, the proponent must upgrade the intersection of the Capricorn Highway and Yackam Road to a BAR/BAL type intersection generally in accordance with SKM drawing number VN40265/ECC/SZK/0001.

The intersection of Blackwater-Cooroora Road with the Capricorn Highway must also be upgraded to a 'seagull' configuration prior to the commencement of any use associated with the project, to cater for project construction traffic and maintain the road safety and efficiency of the State-controlled road network. The proponent shall upgrade the Blackwater-Cooroora Road generally in accordance with SKM drawing number 40265/ECC/SK/0001. The intersection shall be designed and constructed in accordance with the DTMR's Road Planning & Design Manual including the Interim Guide to Road Planning and Design Practice.

To cater for project traffic during construction phase 2<sup>2</sup>, prior to the commencement of any use associated with the project, the proponent shall construct a new mine access intersection with Blackwater-Cooroora Road approximately 11.7 km north of the Capricorn Highway generally in accordance with Figure 5-7 Chapter 5 – Transport and Infrastructure Washpool EIS and SKM drawing number VN4065/ECC/SK/0001. The intersection shall be designed and constructed in accordance with DTMR's Road Planning and Design Manual including the Interim Guide to Road Planning and Design Practice.

Prior to the commencement of any works within the State-controlled road reserve, the proponent shall prepare all engineering drawings in accordance with the DTMR's RFCD-0101 and submit to DTMR for approval. No works, including the installation of services, are to commence within the State-controlled road reserve until approval of the plan/s showing the proposed works is issued by the Department. This approval may be subject to conditions related to the works construction process.

#### **Finalised Traffic Management Plan and permit approvals**

Three months prior to the commencement of any required roadworks to deal with project traffic, the proponent shall prepare detailed drawings and traffic management plans for any required works and other activities in State-controlled road corridors, showing how these road works will be safely undertaken. This information and relevant plans forms part of a required Road Corridor Permit application requiring the approval of DTMR.

Road Corridor Permits and related Traffic Management Plans must also be approved by DTMR prior to the commencement of any use of roads associated with the project.

The proponent shall obtain the necessary permits for any excess mass or over-dimensional loads associated with the project, as required under the *Transport Operations (Road Use Management) Act (Qld) 1995*.

#### **Implementation of DTMR requirements**

The proponent shall implement any necessary roadworks, maintenance, road-use management plans and traffic management plans during construction and operation of the project that have been agreed to by the proponent and DTMR, before and during construction and operation of the project as appropriate. This is required to ensure the ongoing road safety and efficiency of the State-controlled network under the *Transport Infrastructure Act 1994*.

#### **Assess road/rail interfaces**

The proponent is required to engage Queensland Rail (QR) National to undertake a level crossing safety assessment using the Australian Level Crossing Assessment Model (ALCAM) of the road/rail interfaces between the revised

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<sup>2</sup> Construction phase 2 means the remainder of the construction phase using the Mine Access Road via Blackwater-Cooroora Road to access the mine site. Scheduled to begin in 2012, as soon as the Mine Access Road is of a usable standard, i.e. it does not require the Mine Access Road to be fully complete.

rail option and both offshoots of Yackham Road. If it is found that unacceptable safety risks occur under the current design, then the proponent must consider alternative options.

## 4.7 Waste

The EIS discussed excavated and processed wastes generated by the Washpool project that includes overburden, interburden and processing waste from the CHPP.

Overburden (which for subsequent discussion will include interburden) production is expected to total approximately 738.9 million bank cubic metres (bcm) over the life of the mine, consisting of approximately 685.9 million bcm within in-pit dumps, with the balance being placed in out-of-pit dumps.

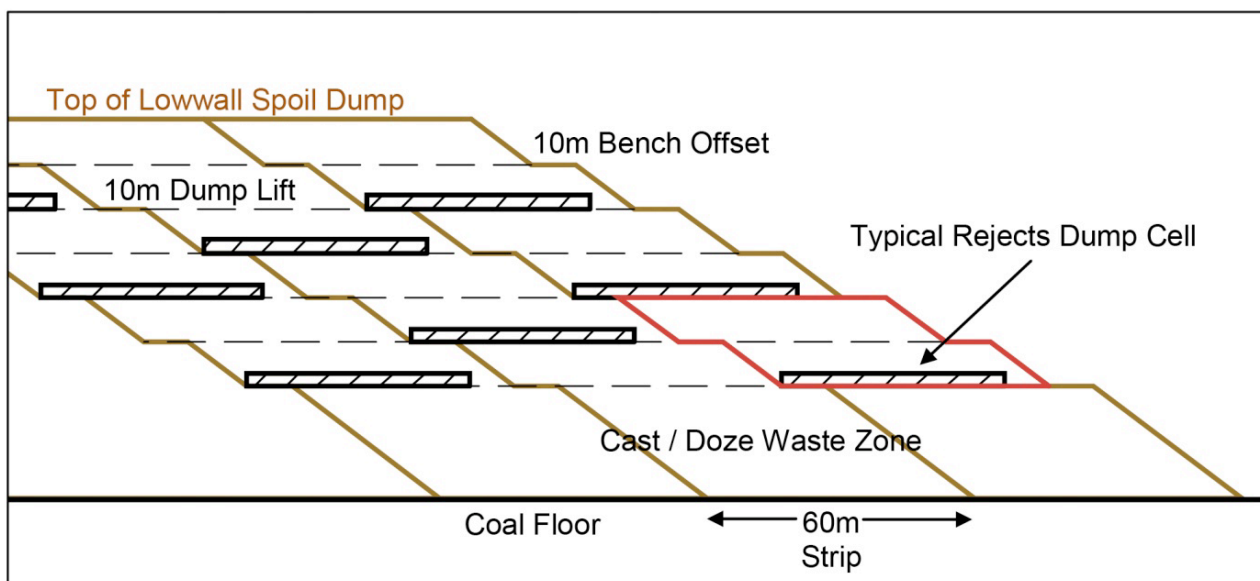
The EIS stated that the project would produce approximately 67 million tonnes of coal rejects (coarse rejects and tailings) over the life of the mine. Rejects are proposed to be dumped in-pit via two methods:

- co-disposing into active tip faces during overburden removal from the pits
- encapsulated in reject cells shown in Figure 1 of this report.

The proponent stated that at no point shall rejects be dumped outside the geotechnical placement design which includes low walls, outside edges of dumps and the highest and lowest tiers of the dumps, thus ensuring the rejects are encapsulated.

The former DERM provided a submission requesting the proponent to provide detailed information on the management of overburden and reject material. In the EIS Addendum (January 2012), the proponent provided adequate information on the management of overburden material, including dewatered fines and coarse rejects. That additional information included the figure below (Figure 1) showing how reject material would be encapsulated in cells buried in-pit.

**Figure 1 - Typical cross section of rejects disposal spoil profile**



Source: EIS Addendum (January 2012) Figure 3-26

Other waste streams to be generated by the project and identified in the EIS, include: regulated waste; general waste; recyclable waste; scrap metal; used tyres; and sewage effluent.

The proponent has committed to managing all waste generated by the project in accordance with the following principles, in descending order of preference: avoidance; re-use; recycling; energy recovery; and disposal. The proponent has also committed to incorporating a program of best practice waste management, including the ongoing assessment of cleaner production and waste management opportunities for the life of the project. Regulated waste will be removed off site by an appropriately licensed waste contractor for disposal at a facility that is appropriately licensed to accept such waste.

The proponent is committed to developing a waste management plan to manage and reduce the potential environmental impacts that may result from generation and disposal of waste. It is recommended that the date which the waste management plan will be completed should be included by the proponent in the draft EM plan.

#### 4.7.1 Waste rock characterisation

The proponent assessed the geochemical characteristics of the overburden and potential reject material from the project. The assessment of this waste rock characterisation may be summarised as follows:

##### **Overburden:**

- most overburden is likely to have negligible (background) (<0.1%) total sulfur content and would therefore be classified as non-acid forming (NAF)
- overburden has significant excess acid buffering capacity for any acid that may be generated by oxidation of minor amounts of sulfur
- the concentration of total metals in overburden materials is well below applied guideline criteria for soils and is unlikely to present any environmental issues associated with revegetation and rehabilitation
- most overburden will generate pH neutral to slightly alkaline runoff/seepage with low to moderate salinity values following surface exposure
- the salinity of runoff-seepage from overburden materials is likely to decrease with time
- the major ion chemistry of initial surface run off and seepage from overburden is likely to be dominated by sodium, bicarbonate, chloride and sulfate
- the concentration of trace metals and sulfate in run off and seepage from overburden is unlikely to present any significant environmental issues associated with surface water and ground water quality as a result of the project
- some overburden material may be sodic, have structural stability problems related to potential dispersion and erosion, and have unbalanced nutrient ratios that could lead to macro-nutrient deficiencies, if not properly managed.

##### **Coal rejects:**

- based on the total sulfur content, the maximum potential acidity that could be generated by the potential coal reject material ranges from low to high. However, only a very small proportion of the potential coal reject material appears to have a high capacity to generate acid.
- reactive sulfides are indicated as being present in coal reject materials, particularly fine coal reject (tailing) materials
- kinetic leach column test results indicate that sulfide oxidation in coal reject materials occurs at a rate that is approximately double that of acid neutralisation
- the sulfide oxidation rate and low to moderate acid neutralising capacity (ANC) of coal reject materials suggests that these materials are unlikely to generate acid runoff/seepage in the short-term (months), but could become a source of acid in the longer term (years) when the ANC of these materials is consumed
- the concentration of total metals in coal rejects is likely to be below applied guideline criteria for soils and should not present any environmental issues associated with revegetation and rehabilitation
- most coal rejects are likely to generate pH neutral to slightly alkaline runoff/seepage, with low to moderate salinity values following surface exposure
- the salinity of runoff-seepage from coal reject materials may increase with time
- the major ion chemistry of initial surface run off and seepage is likely to be dominated by sodium, bicarbonate, carbonate, chloride and sulfate and overtime by calcium, magnesium, bicarbonate and sulfate
- the concentration of sulfate in runoff and seepage from coal reject materials may be elevated compared to background concentrations, but appears likely to remain within applied water quality guideline criteria

- the concentration of soluble trace metals in leachate is low and remains well within applied (ANZECC<sup>3</sup>/NEPC<sup>4</sup>) water quality guidelines for metals for the three month test period. The main exceptions are molybdenum and selenium, as the concentration of these elements in leachate from the fine coal reject (tailing) samples can be elevated compared to the applied guideline values.
- the concentration of manganese can also be elevated in leachate from coarse coal reject materials, although there is no applied guideline concentration for this metal; and the results indicate that there is the potential for elevated molybdenum and selenium levels in leachate from these materials. Molybdenum, selenium and manganese will be included in the suite of elements tested in run-off and seepage from coal reject emplacement area(s), to confirm the mobility of these metals from this material.
- some coal reject material may also be sodic, have structural stability problems related to potential dispersion and erosion, and may have unbalanced nutrient ratios that can lead to macronutrient deficiencies

it is noted that the proponent commits to ongoing management of overburden and coal reject by considering the geochemistry of these materials with respect to their potential risk to cause harm to the environment and their suitability for use in construction and revegetation. In the draft EM plan the proponent commits to implementing the following mitigation measures and these should be included in the final EM plan:

- pre-stripping of topsoil from areas to be disturbed for use in rehabilitation activities
- overburden placement strategies that limit the risk of surface exposure of highly sodic material that may lead to sediment runoff and erosion
- coal rejects management strategies that limit the risk of acid generation and surface exposure of highly sodic material and may lead to run off and erosion
- occurrences of acid rock drainage at the project site would be managed using a containment system, such as in-pit encapsulation within inert or neutralising material.

The proponent also commits to monitoring surface water and seepage from overburden and coal reject material to ensure that key water quality parameters remain within appropriate criteria. This would include as a minimum:

- monitoring of run-off and seepage from the overburden and coal reject emplacement areas for pH, electrical conductivity (EC), total suspended solids (TSS) and dissolved trace metals
- trace metal analysis for coal reject materials, particularly manganese, molybdenum and selenium.

It is recommended that the draft EA include conditions requiring disposal of reject material by encapsulation within the in pit waste dumps as shown in Figure 1, Typical cross section of rejects disposal spoil profile.

## 4.8 Water resources

### 4.8.1 Surface waters

The Mackenzie River is located at the northern boundary of the project area, and flows to the east. Bedford Weir is located 9 km downstream from the project site, but water ponded by the weir backs up past the project site. This water is used by a number of activities including agricultural, irrigation and stock watering, potable water supply, industrial uses and recreation.

The Mackenzie River has an anabranch that breaks from Burngrove Creek just upstream of the project area and flows through the western part of the proposed mining lease (ML80164). This anabranch will form the western boundary of the mining area. The anabranch includes Coal Mine Lagoon which is a natural lagoon approximately 50 m wide and 500 m long. The lagoon connects with the Mackenzie River during flood events.

Burngrove Creek flows from south to north and flows to the Mackenzie River about 2 km downstream of the break-out to the anabranch and Coal Mine Lagoon. Burngrove Creek is an ephemeral water course.

The project mining area covers approximately 37.9 km<sup>2</sup>. The EIS stated that the mining areas of the project account for less than 0.1% of the Mackenzie River catchment contributing to flows in the river at the project site. Consequently, land disturbance at the site would have a negligible effect on catchment runoff.

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<sup>3</sup> ANZEC means the Australian and New Zealand Environment Conservation Council (

<sup>4</sup> NEPC means the National Environment Protection Council



The EIS assessed the following environmental values of surface waters:

- aquatic ecosystems
- primary industries (irrigation, stock drinking water, aquaculture and human consumption of aquatic foods)
- recreation and aesthetics
- drinking water
- industrial water
- cultural and spiritual values.

The EIS stated that a controlled release strategy is proposed as part of the site water management strategy to minimise the risk of uncontrolled releases during periods of extended rainfall. Controlled releases from the Main Retention Dam (MRD) would be likely to occur on average less than one day each year, with an average volume of 99.5 ML/day at such times. The controlled releases will be required to meet the Final Model Water Conditions for Coal Mine in the Fitzroy Basin, e.g. minimum background flow conditions and water quality discharge limits.

Under the proposed controlled release strategy, releases would be made from the MRD via a dedicated valve. Releases would outfall to Burngrove Creek, approximately 3 km upstream of the confluence with the Mackenzie River and approximately 0.8 km upstream of the entrance to the Anabran and Coal Mine Lagoon.

Modelling of the site water management strategy shows that the average salinity of releases over the mine life would be approximately 1510  $\mu\text{S}/\text{cm}$ . A high-level estimate of downstream salinity in Burngrove Creek during releases has been produced using conservative assumptions. After dilution, in-stream salinity in Burngrove Creek is expected to be well below the recommended values for the protection of aquatic health and for downstream water users, of 1,000  $\mu\text{S}/\text{cm}$  and 750  $\mu\text{S}/\text{cm}$ , respectively (DERM, 2010). The proponent notes that once these flows reach the Mackenzie River they would be further diluted by Mackenzie River flows, therefore the impacts to water quality affecting aquatic health and existing water users downstream are expected to be minimal.

Two southern sediment dams would be located south of the mine infrastructure area and would have a volume of 218 ML and 260 ML respectively. These dams would collect run off from the mine infrastructure area. This water would then be transferred to the MRD for use in dust suppression. Sediment dam 2 would overflow to sediment dam 1 and sediment dam 1 would overflow to the MRD. The proponent stated that these dams would not discharge offsite. It is recommended that sediment dams 1 and 2 be licensed as regulated dams in the draft EA because of the risk of any sudden release of water from the sediment dams situated upstream of the main retention dam (MRD) could result in overtopping of the MRD.

Three other sediment dams would be located in the northern part of the proposed mining lease. These sediment dams would receive rainfall run-off from disturbed areas, the northern overburden dump and areas that would not yet be fully rehabilitated. Overflow from the northern sediment dams would overflow directly to the Mackenzie River after treatment. The design criteria for the sedimentation dams are outlined below:

- to provide sufficient residence time to settle 0.05 mm diameter (course silt) particles from the water column and enough storage volume to capture a 24-hour, 1 in 10 year annual exceedence probability (AEP) storm event
- to maximise the length of the dam relative to the width of the dam to maximise hydraulic retention time and deposition.
- each sediment dam will have an approximate area of 36 ha of catchment area from which they will collect runoff when the dump is at its largest point
- the three sediment dams will require a volume of approximately 6ML based on the runoff parameters adopted within the water balance model for unrehabilitated spoil.

EHP considers the waters from the northern sediment dams should be considered as mine affected waters under the Final Model Water Conditions for Coal Mines in the Fitzroy Basin, since the sediment dams would receive stormwater from disturbed land and leachate from overburden dumps. Consequently, it is recommended that the proponent categorise the northern sediment dams as holding mine affected water and that these be included in Table 1 (Mine affected water release points, sources and receiving waters) and Table 5 (Water storage monitoring) with reference to the Final Model Water Conditions for Coal Mines in the Fitzroy Basin.

Also the northern sediment dams will be required to be constructed in accordance with the Code of Environmental Compliance for Mining Lease Projects (DERM, 2001).

The EIS stated that the proponent intends to minimise the impact of the mining operation on Coal Mine Lagoon, Burngrove Creek and the Mackenzie River, by undertaking the following practices:

- fencing the mine lease area and excluding stock from water courses
- managing water on-site to minimise contamination and therefore the treatment and disposal of waste water
- preserving a buffer around Coal Mine Lagoon
- excluding all unauthorised mine personnel and plant from entering the Mackenzie River and Burngrove Creek from the mine site
- implementing a routine environmental monitoring programme (water, flora, rehabilitation, and groundwater) during the construction and operation phases of mine life.

The former DERM advised the proponent that the EIS had a number of outstanding surface water issues, including:

- water quality data in the EIS was insufficient for the purposes of establishing background conditions, identifying environmental values and setting appropriate water quality objectives and mine water discharge limits
- the proponent was requested to resubmit a revised receiving environment monitoring program (REMP) and to use this to obtain more surface water samples and assess background conditions of local waterways against water quality guidelines
- inadequate assessment of aquatic ecosystem environmental values within the project area
- inadequate application of water quality objectives for all relevant indicators as listed in the Final Model Water Conditions for Coal Mines in the Fitzroy Basin
- the proponent was requested to review the controlled release strategy with consideration of the Final Model Water Conditions for Coal Mines in the Fitzroy Basin, 2011
- inadequate assessment of impacts from the deterioration of water quality held in mine pits and associated impacts of discharging this water to the MRD and receiving watercourses
- the proponent was requested to include monitoring of water in the mine pit to determine the risk of contaminated water being released from the MRD as a result of receiving dewatered pit water
- insufficient information was provided on the dimensions and design parameters of proposed water storage facilities, including how water would be transferred from the northern sediment dams to the MRD as shown in figure 7-32, *Components of the Water management System*, of the EIS
- insufficient information was provided in the rehabilitation plan for Burngrove Creek and Coal Mine Lagoon, including active rehabilitation of areas associated with these waterways during the life of the project
- the *Water Resource (Fitzroy Basin) Plan 1999* is currently under review with potential changes that may impact on the overland flow provisions for the mine development.

In response to issues raised by the former DERM regarding the surface water assessment in the EIS, the proponent provided the following:

- a commitment to incorporate any changes to the *Water Resource (Fitzroy Basin) Plan 1999* into the mine operating procedures
- data from additional water quality sampling that had been undertaken at the project site
- a commitment to manage potential impacts associated with releases from the MRD through a controlled release strategy
- a commitment to preserve existing environmental values of Coal Mine Lagoon and are associated anabranch by fencing off the proposed area to ensure stock do not enter the area
- a revised REMP
- environmental values and water quality objectives for the protection of aquatic ecosystems
- a condition assessment for all identified environmental values

- a commitment to implementing the REMP as soon as possible to provide sufficient surface water data to determine the background condition of waterways.

In the EIS Addendums (January and February 2012), the former DERM considered that the proponent had not adequately addressed all of the department's issues concerning surface water. In order to address surface water issues adequately, the proponent should amend its draft EM plan and REMP according to EHP's comments set out in appendices A and B of this report. Also, the proponent should implement a REMP as soon as possible in order to obtain necessary, additional background surface water data.

The recommended changes for the REMP described in Appendix B, include:

- proposed procedures for assessing any exceedances of the water quality objectives (WQOs) or trigger values, in accordance with water quality guidelines
- referencing to mine affected water storages should be removed from the REMP and included in the Mine Water Management Plan
- monitoring sites should reflect receiving water upstream for background/reference sites and downstream monitoring sites in accordance with the Final Model Water Conditions for Coal Mine in the Fitzroy Basin
- changing the condition assessment of aquatic ecosystems from “highly disturbed” to “moderately disturbed”
- removing the stated condition of all other environmental values and identify additional environmental values applicable to the downstream environment that need to be protected from potential impacts of mining
- using the Mackenzie River Sub-basin Environmental Values and Water Quality Objectives (DERM, 2011) as the source for locally derived and validated WQOs for each indicator
- making amendments to the following tables:
  - tables 5-2, *Mackenzie River – Environmental Values*, 5-3, *Burngrove Creek – Environmental Values* and 5-4, *Coal Mine Lagoon – Environmental Values* and 5-6, *Water Quality Objectives*
  - table B2, Concentrations of Metals, Alkalinity, Sulphate (SO<sub>4</sub>) Total Dissolve Solids (TDS) and comparison with Guideline Values – 2010/2011
  - table B4, Physical and Chemical Water Quality Measurements and Concentrations and comparison with Guideline Values – 2010/2011.

The proponent provided adequate mitigation measures in the draft EM plan to address impacts on surface waters including the following commitments:

- ‘clean’ water run off from undisturbed areas will be diverted away from disturbed areas
- surface run off from disturbed areas will be captured on-site in sediment dams and preferentially used for operational purposes to minimise the likelihood of discharge off site
- sedimentation dams will capture the bulk of suspended sediment from run-off from disturbed areas prior to any discharge off site
- sediment will be periodically removed from sediment dams to maintain their design capacity, particularly prior to the wet season (i.e. by November each year)
- a levee bank will be constructed to protect infrastructure and mining areas from flooding
- the design and construction of all water management structures will be based on practical hydraulic parameters, applying an appropriate level of risk that considers rainfall events, catchment size, slopes, surface profile and soil types
- the project’s water management plan will be designed to ensure all off-site discharges do not exceed the defined discharge criteria and limits
- temporarily or permanently bund will be provided in accordance with the applicable standards for all storage areas for significant quantities of hydrocarbons and chemical products
- spill capture and retention devices will be install in applicable areas (e.g. fuelling stations)
- a licensed operator will collect and remove waste oil and other hydrocarbon waste (such as captured fuel spillage) from the project site

- design constructed drainage and discharge structures that do not alter the natural bed and bank profile of all water courses
- all machinery will be stored, refuelled and maintained outside the high banks of watercourses
- the proponent will implement a surface water monitoring program for trend analysis, impact assessment and complaint investigation.

The EIS stated that a Mine Water Management Plan will be developed for the project to ensure the protection of surrounding waterways. In addition to addressing the commitments noted above, the Mine Water Management Plan will ensure that any water that will be pumped from the pit would only be directed to the MRD, to prevent contamination in sediment control dams:

It is recommended that the mine water management plan include the pit water quality monitoring.

## 4.8.2 Flood impacts

The EIS stated that the project site would be largely un-affected by flooding during a probable maximum flood (PMF) event. The proponent stated that refinement of the final void location during detailed design and mine planning will ensure that the final void location is not affected by the predicted PMF event.

In the EIS the proponent undertook flood modelling for the mine to determine the flood protection strategy for the mining areas and assess potential impacts on flooding caused by the project. Modelling was completed for the 1 in 20, 100, 1,000, 2,000 and 5,000 annual exceedence probability (AEP) flood events. The flood modelling considered modifications to the existing project design including the flood levee and location of the product haul road corridor options.

The proposed flood protection levee would provide a 1-in-2,000 AEP immunity for the project mine and industrial areas with controlled overtopping over the spillway of the MRD in a 1-in-5,000 AEP event. This flood immunity from the levee meets the guidelines *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* (DERM, February 2012) that specifies a flood protection of 1: 1000 AEP + 0.5 m freeboard. The western toe of the flood protection levee will be located at least 50 m from the top of the bank of the Coal Mine Lagoon channel. No project elements are proposed to be located in between the levee and Coal Mine Lagoon.

The modelling of the flood impacts of the levee in the EIS was considered satisfactory. The modelling indicated the 1-in-2 000 AEP peak velocities along the front face of the levee would generally range between 1 and 2 metres per second (m/s) with peak velocities being up to 2.5 m/s in some areas. The design of the levee will need to include appropriate rock protection and vegetation to prevent scouring of the levee.

The EIS showed the eastern toe of the levee would be located about 30 metres from the edge of the mine pit. The proponent makes a commitment that a geotechnical assessment will be undertaken during the detail design stage to determine whether the proposed 30 m buffer distance between the levee and pit would be adequate.

The EIS stated that the development of the pit and associated levees at this location would present a potential risk to the stability of the floodplain and Coal Mine Lagoon. There is the risk that during high flows, raised water levels adjacent to the levee could result in increased seepage pressures through groundwater entering the pit, leading to potential instability or failure of pit the wall and even levee collapse. If this were to occur, a pit lake would form. To address the risk of the levee collapsing during a flood, EHP recommends the following conditions be included the EA:

### Flood protection levee buffer zone

- (X1) Where the advance of the open-cut excavation reaches a point where the highwall or endwall edge of the mine excavation is at a distance of 60 metres from the downstream toe of the Q2000 levee (that is, from the inside toe of the levee facing the mine excavation) a geotechnical investigation must be undertaken by a suitably qualified and experienced person to determine the stability of the pit highwall or endwall in the proposed open-cut excavation.
- (X2) Prior to any advance of the excavation closer than 60 metres to the downstream toe of the Q2000 levee two copies of a certified report must be submitted to the administering authority. The certified report must demonstrate the stability, with a minimum factor of safety of 1.5 against collapse, of the highwall or endwall excavations and adjacent levees under all foreseeable conditions, and include the passage and weight of floodwaters outside the levees which would occur during a Q2000 flood event in

the Mackenzie River. This certified report will be treated as a design plan which is to be submitted under the conditions of this licence relating to Regulated Dams, and will form part of the certified design plan for the design and construction of the levees.

- (X3) Where, on the basis of a satisfactory geotechnical report, open-cut mining advances closer than 60 metres to the downstream toe of the Q2000 levee, the excavations for mining must at all times and unconditionally leave a buffer distance of at least 30 metres between the downstream toe of the Q2000 levee and the highwall or endwall edge of the mine excavation.
- (X4) The upstream toe of the Q2000 levee (that is, the outside toe facing the Mackenzie River) must be at least 60 metres from the top of the high bank of Coal Mine Lagoon.
- (X5) During mining operations the minimum 30 metre buffer between the downstream toe of the Q2000 levee and the highwall or endwall edge of the mine excavation must be monitored for signs of surface cracking. Any evidence of cracking or signs of highwall or endwall collapse must be reported to the administering authority within 24 hours.

In addition to the above conditions, EHP will also include conditions in the EA with regard to the levee being a regulated structure, requiring certified design plans to be submitted to EHP, and being subject to annual inspection and reporting by a suitably qualified person.

The two product haul road options that were assessed in the EIS with regard to flooding included:

- Road Option A: a new east-west combined light vehicle access road and product haul road from the project site, connecting to Blackwater-Cooroora Road and a train load out area
- Road Option B: a new east-west access road from the project site, connecting to Blackwater-Cooroora Road for light vehicles (as for Option A) with the addition of a new internal south-western product haul road from the project site to a train load out facility.

The EIS made the following assessments regarding flood impacts from the haul road options:

- Modelled flood impacts from Option A would be acceptable in a rural area, with the afflux limited to less than 300 mm beyond the proposed ML boundary for both the 1-in-20 and 100 AEP events. These flood impacts would extend across a large area off-lease, but, no buildings would be impacted. Additionally, this flood impact would not generally increase the duration of inundation across these areas.
- The current design of haul road Option B could cause unacceptable flood impacts off lease. The afflux caused by Option B would be significantly greater than that caused by Option A, with off-lease impacts of up to 1 100 mm adjacent to the haul road in both the 1-in-20 and 100 AEP events.
- Afflux caused by Options A and B in the 1-in-1 000 and 2,000 AEP events would be limited to 150 mm in both events
- For Options A and B, the afflux from a 1-in-2 000 AEP are similar or less than the 1-in-100 AEP and the flood is spread over a larger area than a 1-in-100 AEP. This is due to the flows from a 1-in-2 000 AEP are engaging additional parts of the floodplain as well as the active channels.

The flooding and dust issues associated with the haul road Option B, were considered unacceptable, and it was replaced with the preferred Rail Option B1, that involved replacing the south-western haul road with a rail extension from the south all the way to the MIA.

Following the 2010/2011 flooding that took place in the Mackenzie River, the former DERM requested the proponent to undertake additional model verification on the model created for the Washpool Coal mine EIS, and that was provided in the EIS Addendums (January and February 2012). The flood verification undertaken by the proponent found that the model generally gave results that were consistent with the observed flood extents.

The former DERM received a submission on the EIS from a landholder requesting additional modelling of the impact that the levee would have had in the 2010/2011 flood event. In the EIS Addendum, the proponent stated that modelling of the 2010/2011 rain event with the levee resulted in impacts less than 200 mm in off-lease areas. Impacts of this magnitude are generally considered acceptable in rural areas. These impacts would extend across a large area beyond the proposed mining lease boundary. However, no buildings would be impacted. The impact area is generally used for pasture and some limited cropping and is already subject to flooding under existing conditions. Additionally, the levee would not generally increase the duration of inundation across these areas.

The EIS Addendums (January and February 2121) discussed flood impacts from the new and preferred rail transport corridor Option B1 that crosses two main watercourses on the Burngrove Creek floodplain at Burngrove Creek itself and a tributary called Sandy Creek. The modelling of potential flood impacts of the rail line, in conjunction with the levee, compared the developed and existing peak water surface levels for a 1-in-100 AEP event. The modelling predicted that the afflux caused by Rail Option B1 would be locally significant, with off-lease impacts of up to 1.1 m immediately adjacent to the rail line. However, those impacts would dissipate to less than 300 mm, at 500 m upstream of the rail line, and no buildings would be impacted by the flooding. Given the relatively rapid decrease in afflux with distance from the rail line, and that no built property would be affected, the former DERM considered that the flood impacts from Rail Option B1 would be acceptable. Furthermore, the detailed design for Rail Option B1 (which has not yet been undertaken) may find ways to mitigate these impacts so that impacts are contained within the planned rail corridor. The proponent stated that these impacts could be reduced through optimisation of the number and size of hydraulic structures under the rail line.

### 4.8.3 Groundwater

The EIS stated that a total of nine groundwater bores were installed in the project area to assist in assessing potential impacts, risks and constraints to groundwater associated with the project. Groundwater level and quality monitoring were undertaken at all nine monitoring bores. However, only one monitoring bore was placed in the alluvial sediments and at location to the west of Coal Mine Lagoon that is not in the area to be mined. Four of the other bores sampled underlying siltstones and coal seams within the proposed pit area and remaining four sampled siltstones and coal seams immediately to the north of the pit area.

A survey of the former DERM groundwater database was undertaken by the proponent within a 15 km radius of the project. The survey identified a total of four registered groundwater bores situated between 5 km and 6 km east of the project area.

The EIS stated that the groundwater quality monitoring of the project indicated that the groundwater is unsuitable for potable use and the protection of freshwater ecosystems and marginally suitable for irrigation and stock water. In particular, salinity levels exceeded criteria for irrigation in half of the bores sampled, and aluminium levels exceeded criteria for stock watering in two thirds of the bores sampled.

Falling and rising head permeability tests were undertaken at three groundwater bores: two bores within the Burngrove Formation and one bore within the coal measures aquifer. The aquifer test data was analysed using the Bouwer and Rice solution (Bouwer 1989) to estimate the aquifer permeability (hydraulic conductivity), which is required as an input into analytical groundwater modelling.

The proponent developed a conceptual hydrogeological model of the project area that was based on limited hydrogeological data.

Based on the hydrogeological model and groundwater level data, the proponent claims the following regarding groundwater in the project area:

- there are two important groundwater systems: the shallow alluvial comprising Quaternary and tertiary sediments associated with the nearby Mackenzie River, and the underlying Permian coal measures aquifer within the Burngrove Formation
- the Cainozoic sediments are dry and situated above the River stage. Therefore no local hydraulic connection is expected between the Cainozoic sediments and the Mackenzie River
- regionally, where an alluvial aquifer is present, recharge to the alluvial aquifer is likely to be in the form of direct infiltration from rainfall and from the Mackenzie River, as well as deeper groundwater baseflow
- discharge from the alluvial occurs via evapotranspiration, particularly where groundwater levels are in close proximity to the ground surface such as along the banks of the Mackenzie River where there is also riparian vegetation
- the alluvial aquifer will also discharge into the underlying coal measures aquifer
- the alluvial and coal measures aquifers are in hydraulic continuity with each other

The proponent predicted the following potential impacts to groundwater due to mining operations:

- drawdown will be localised and temporary, with the groundwater table eventually recovering to pre-mining levels in the period following mine closure
- the maximum groundwater drawdown will extend up to 1.4 km from the mine pit and thus pose a low risk to groundwater bores established 5 km to 6 km away in neighbouring properties
- dewatering operations will draw in water from the aquifer and/or other connected aquifers and may result in increased leakage from the Mackenzie River
- groundwater quality may be altered during the project operation phase as dewatering will possibly induce inflow of water from other connected aquifers in the project area as well as leakage from the Mackenzie River
- the development of a mine pit will locally disrupt the groundwater system within the alluvial and coal measures aquifers
- none of the surface water bodies in the vicinity of the project area are groundwater fed, but drawdown in the alluvial aquifer may potentially increase leakage from the Mackenzie River into the aquifer
- the increased leakage (if it occurs) from Mackenzie River will be temporary and will gradually reduce to zero as the groundwater table approaches to pre-mining levels in the period following mine closure
- Coal Mine Lagoon and Burngrove Creek are unlikely to be impacted by mine dewatering
- the mine operations are expected to pose a low risk of impacts to aquatic ecosystems or riparian vegetation along the Mackenzie River
- it is considered unlikely that salination of groundwater due to evaporation would occur beneath the final landform.

In regard to mitigation, the proponent stated that regular groundwater monitoring will be undertaken during operations to monitor the extent of drawdown close to the project area and identify the risk of impacts occurring before they are experienced in surrounding landholder bore.

Furthermore, if monitoring indicates that impacts are likely to occur, the proponent will reach mutually acceptable 'make good' arrangements with affected neighbouring that could include establishing alternative supplies before existing bores are adversely affected. The proponent stated that due to the progressive nature of drawdown within the aquifers, the provision of alternative supplies is likely to be staged.

The former DERM's submission on the EIS found that the groundwater assessment was inadequate. Issues with the groundwater assessment that the proponent was subsequently requested to address, included:

- assessing the groundwater system as a three component system comprising the quarternary alluvial aquifer, the tertiary sediments and the Permian coal measures, and not a two aquifer system as outlined in the EIS
- greater detail on the groundwater characteristics including aquifer depth and type, water levels, water quality and yields, for the aquifers systems in the project area
- a sufficient number of bores to assess groundwater characteristics
- addressing gaps in the monitoring program as a result of the small number of existing groundwater bores not having been monitored initially
- identifying all existing groundwater bores on site and at neighbouring properties
- using private alluvial bore (111877) for describing the background water quality in the alluvial deposit
- providing separate water level graphs, one for the alluvial and tertiary aquifers and one for the coal measures at the appropriate scales to show water level behaviour
- including water level plots at appropriate scales for an adequate representation of the water level behaviour for each aquifer
- further water level analysis to determine the relationship between the aquifers and the Mackenzie River, taking into account the water level in the bores and the river
- impacts of dewatering on the aquifer and surface water needs to be revised and a numerical groundwater model used to assess impacts on the water resources

- propose adequate mitigation measures for, the potential impacts of mine dewatering on the effective take of water in the Bedford weir storage on the Mackenzie River

Also, the former DERM considered the groundwater section of the first draft of the EM plan was inadequate. Issues with the draft EM plan that the proponent was requested to address, included:

- the need to establish monitoring points in the Mackenzie river and coal mine lagoon
- a commitment in the EIS to mitigate the impacts of mining on groundwater and surface water to follow on from the recommendations in the groundwater report
- identifying the quantity of surface water will be taken by mine dewatering and identify strategies to either mitigate or ensure that no surface water is taken
- revising the groundwater monitoring program to include additional monitoring bores
- include the missing parameters for groundwater water level monitoring.

In the response to submissions dated 29 August 2011 and the EIS Addendum (January 2012) the proponent provided an unsatisfactory response to the above groundwater issues and was advised to readdress the groundwater issues raised by the former DERM in a supplementary EIS Addendum.

In the EIS Addendum (February 2012), the proponent concluded that the Cainozoic sediments within the area of the project are dry and disconnected from the river and do not constitute an aquifer. This was a change from the groundwater conceptualisation in the EIS released for public viewing, which stated:

- the alluvial aquifer in the project area is expected to exist in association with the nearby Mackenzie River and floodplain
- pit dewatering during mining will cause additional seepage from the river to the alluvial aquifer

In the EIS Addendum (February 2012) the proponent provided the following:

- an additional figure showing the depths of alluvial, Cainozoic sediments based on 266 drilling locations in and around the proposed mining area, and indicating that all holes were dry except for one to the west of Coal Mine Lagoon
- a commitment to conducting a survey of landowner bores
- a commitment to contacting a landowner for permission to sample bore 11187 to be used to describe the alluvial aquifer
- a groundwater monitoring program that has three groundwater bores towards the river to investigate if the Cainozoic sediments are saturated in this area
- further information on groundwater characteristics, groundwater and surface water interaction and groundwater modelling.

The former DERM considered that the EIS Addendum (February 2012) addressed some of the previous issues raised. However, EHP considered the hydrogeology of the alluvial aquifer did not provide a clear description of the yields of the system, water levels, water quality, or the significance of the aquifer at a regional level.

Outstanding issues of concern with the draft EM plan (February 2012), include the following:

- table 12 and information in the proposed EA conditions have not been updated to include additional monitoring points or the parameters
- not including three bores in each aquifer system (i.e. quaternary alluvial aquifer, the tertiary sediments and the Permian coal measures) that was recommended for the groundwater monitoring program
- the groundwater monitoring program was insufficient to accurately monitor the impacts of the mine on groundwater and surface water

In summary, the assessment of potential groundwater impacts in the first version of the EIS was lacking both in detail and clarity; and the subsequent additional information provided by the proponent in response to requests from the former DERM was not as complete as EHP was seeking. The monitoring data provided in the EIS included large time gaps during which no monitoring was undertaken, and the description of the aquifers on the site did not meet the requirements of the terms of reference for the EIS. A particular deficiency was the shortage of



monitoring bores in the alluvial sediments, with only one bore able to sample the alluvium to the west of Coal Mine Lagoon and none at all between the northern edge of the pit and the closest reach of the Mackenzie River.

The proponent stated that the reason for the lack of monitoring bores in the alluvium was that exploration drilling on the site had found no water in those sediments, except at one site to the west of Coal Mine Lagoon and therefore that monitoring bores were not needed. It may be possible that the alluvium in the proposed pit area is always dry or only receives minimal recharge by direct infiltration of rainwater. However, without long-term monitoring, the assumption that there will never be a significant amount of groundwater in the alluvial sediments cannot be made with any certainty or verified. It is a significant failing of the EIS that adequate monitoring was not undertaken at least quarterly during the study period, which started in 2009, and that failing must be rectified at the earliest opportunity.

The proponent has stated that the alluvial sediments are not hydraulically connected to the river. However, the lack of monitoring data provided in the EIS does not allow a full assessment of that conclusion. If it is not true, the mine could experience greater inflows of water into the pit that the EIS assumed, which in turn could result in water management problems for the site.

While the gaps in monitoring data were not rectified, the additional information provided by the proponent in February 2012 did include an isopach map of the alluvial sediment depths at the site. The map covered the area between the northern edge of the proposed pit and the nearby bend of the river, and indicated that alluvial sediments between the pit and the river are relatively shallow, being 10 m or less in depth. As the river channel to the north of the pit is deeply incised, the isopach map supports the proponent's assertion that the alluvial sediments are not usually hydraulically connected with the river. However, the EIS provided insufficient information to assess whether or not during times of flooding in the river, the pit would become hydraulically connected through the sediments. Furthermore, EHP is aware that groundwater levels in other alluvial and tertiary aquifers in the region have risen substantially in the last two years due to the return of the wetter weather and significant recharge occurring in the groundwater system in the Central Highlands area.

EHP will require the proponent to provide additional information before excavations for the pits can begin at the site. To address the deficiencies in the EIS, EHP will require the proponent to install additional monitoring bores cased to sample the base of the alluvial sediments, both to the west and the north of the proposed pit area. Monitoring of all bores at the site, whether into the alluvium or the underlying strata, must be undertaken at least quarterly for a minimum of 12 months before any excavation for the initial box cut; and if water is found in the bores then data must be obtained about the aquifer characteristics and the water quality as required by the terms of reference for the EIS. Furthermore, the water management plan for the mine must be reconsidered after the additional 12 months of monitoring and any necessary changes made if the predictions of water inflow to the pit are revised in the light of the additional data. These information requirements should be incorporated in the revised EM plan for the project.

It is recommended that the draft EA include conditions requiring the proponent to undertake the following activities before mining commences:

- providing EHP with a revised groundwater monitoring program for review and approval prior to the commencement of mining that includes adequate representation in all aquifers
- installing more groundwater bores between the pit and river to investigate any aquifers in the Cainozoic sediments
- undertaking a landholder bore survey prior to the submission of the proposed groundwater monitoring programs
- obtaining twelve months of groundwater data, recording the groundwater results quarterly and presenting the data to EHP prior to the commencement of mining
- revising the groundwater model and management plan after twelve months of groundwater monitoring
- proposing mitigation measures for the take of water from the river
- providing outcomes from discussions with SunWater regarding the potential losses from the river as a result of mining

Also, the proponent will be required to provide the above information in the revised EM plan.

## 4.9 Air quality

The proponent adequately addressed air issues during the EIS process, including dust emissions.

The Ausplume model was used to predict PM<sub>10</sub><sup>5</sup> and total suspended particles<sup>6</sup> (TSP) concentrations and dust deposition rates at places with environmental values for the air environment (receptors) for year 1 and year 10 of mining operations. The EIS stated that mining operations during year 10 are considered to have the highest potential for air quality impacts because this scenario has the highest overburden removal rates. The EIS also stated that year 1 mining operations would be the closest to nearest, downwind receptors.

The EIS stated that the predicted PM<sub>10</sub> and TSP concentrations were below ambient air quality goals in the Environmental Protection (Air) Policy 2008 (EPP(Air)), except for the predicted 24 hour PM<sub>10</sub> concentration in year 10 of operations at the nearest receptor if the Road Option B was developed, due to the haul road not being sealed and having the potential to generate wheel generated dust.

The former DERM's submission on the EIS advised the proponent about a number of issues with the air assessment, including:

- The air pollution model (TAPM) generated meteorological files needed to be reviewed to ensure the input values for the reported Ausplume modelling were realistic for the situation expected to be encountered at the Washpool project site
- uncertainty regarding the background dust concentrations used
- uncertainty about whether the predicted dust concentration values represented the maximum concentration
- the EIS did not assess the worst case scenarios for dust emissions
- PM<sub>2.5</sub> emissions and their impacts were not adequately assessed
- a speed limit of 80 km/hr was not an acceptable mitigation measure for dust generation from haul roads
- the draft EM plan provides little detail on the air monitoring program.

The proponent responded to the former DERM's issues in its response to submissions (29 August 2011). The response proposed a new and preferred transport option (Rail Option B1) for transporting product coal that involved removing the south-western haul road and building the coal handling and process plant (CHPP), train load-out (TLO) and rail loop side by side and adjacent to the general MIA. For that option, the predicted TSP and PM<sub>10</sub> concentrations were found to comply with the ambient air quality objectives at the sensitive receptors.

In the response to submissions, the proponent stated that the PM<sub>2.5</sub> concentrations had been assumed to be 10% of PM<sub>10</sub> emissions based on the ACARP study Fine Dust and the Implications for the Coal Industry (Air Noise Environment, 1999). The proponent predicted that the 24-hour PM<sub>2.5</sub> concentrations for the year 1 and year 10 operations would be well below the guideline maximum of 25 µg/m<sup>3</sup> at all receptors.

After reviewing the response to submissions, the former DERM advised the proponent that there were still some outstanding issues that needed to be addressed, including the need to:

- recalculate the PM<sub>2.5</sub> emissions from the project through air modelling, assess any potential impacts and propose any necessary mitigation measures
- replace the proposed speed limit of 80 km/hr on unsealed roads with a more appropriate dust mitigation measure

The EIS Addendum (20 January 2012) provided an adequate response to the outstanding air issues, including:

- updating the modelling of PM<sub>2.5</sub> emissions to include diesel combustion and confirming that predicting PM<sub>2.5</sub> emissions would still be below the air quality objectives in the EPP (Air)
- updating the draft EM plan to include additional mitigation measures for minimising dust from haul roads.

EHP found the 'air quality' section of the amended draft EM plan to be adequate and included the following dust mitigation measures:

- exposed areas (particularly haul roads) are to be watered during construction and operations, as required

<sup>5</sup> PM<sub>10</sub> means particles in the air environment with an equivalent aerodynamic diameter of not more than 10 microns.

<sup>6</sup> Total suspended particles means particles in the air environment with an equivalent aerodynamic diameter of not more than 50 microns.

- traffic on mine roads will be limited to a maximum speed of 60 km/hr
- topsoil stripping will be managed so that dust does not become a safety hazard or nuisance
- land disturbance will be kept to a minimum
- disturbed areas, including disused roads and overburden dumps will be progressively rehabilitated
- cleared vegetation will not be burnt on site
- dust suppression sprays will be fitted at locations in coal handling facilities that may produce excessive dust, such as crushers and transfer points
- all reasonable and practical measures to reduce dust from blasting will be undertaken including the monitoring of weather forecasts and site conditions. Sensitive receptors will be notified prior to blasting activities commencing
- legitimate complaints about dust will be promptly investigated, and appropriate actions implemented to reduce dust nuisance, where required
- all complaints received will be recorded on a complaints register. Complaints will be recorded and investigated and mitigation measures implemented, where required. The complaints register will be maintained for management purposes (i.e. for analysis, review and auditing)
- all practical measures will be taken to reduce coal loss during transportation. Mitigation measures will include monitoring to ensure that overloading of carriages does not occur
- activities with the potential to generate dust may be halted during excessively windy periods (e.g. top soil stripping)
- site environmental management practices detailed within the draft EM plan will be periodically reviewed to ensure effective operation and to consider alternate and new methodologies.

To reduce dust generated from coal trains, the proponent committed in the EIS to applying a veneer to the coal surface at the train load out facility.

The proponent stated that ongoing dust monitoring will be undertaken to determine if mining operations are generating potential air quality impacts at nearest receptors. The dust monitoring program will focus on the receptors with the greatest potential for air quality impacts. The proposed dust monitoring program will consist of measuring dust deposition rates at a minimum of four locations around the project site. Intermittent PM<sub>10</sub> monitoring will also be undertaken to determine if the operations comply with the air quality goal in the EPP (Air). It is recommended that the environmental authority include a condition requiring the proponent to undertake PM<sub>10</sub> monitoring at the nearest receptor for a period of one year after commencement of operation to validate the modelling results.

Also, the proponent has committed to consulting regularly with landholders about the effectiveness of dust mitigation measures with a view to reducing the potential for dust nuisance.

## 4.10 Noise and vibration

Noise monitoring showed that the noise environment was typical of a rural residential setting where noise levels were influenced by local and distant traffic, insects, birds and rustling leaves. The EIS stated that there were no significant mine related noise impacts at sensitive receptors. The EIS found that the evening and night time noise levels to be higher than the daytime noise levels because of ambient insect noise.

Existing background noise levels in the area surrounding the project site were determined through attended and unattended noise monitoring surveys, carried out at three locations between 22 February and 1 March 2010. The three noise monitoring included the following locations:

- sensitive receptor 2: the nearest sensitive receptor, located approximately 7 km south of the project site
- sensitive receptor 3: located approximately 9 km east of the project site, near the Curragh Mine, (only short term attended monitoring was undertaken at this location)
- sensitive receptor 4: located approximately 9 km north east of the project site.

A computer noise model was developed using SoundPlan version 7.0 to predict the noise impact on the sensitive receptors during different stages of the mining operations, including:

- years 1 to 5
- years 6 to 10
- years 11 to 15.

The proponent used the *Planning for Noise Control Guideline* (EPA 2004) when developing measures for protecting the existing noise amenity and minimising intrusive noise impacts from operational noise sources.

The EIS stated that the predicted  $L_{Aeq,1hour}$ <sup>7</sup> noise levels range between 12 and 25 dB(A) at the noise sensitive receptors during the entire project life. These predicted noise levels are well below the daytime noise criterion of  $L_{Aeq,1hour}$  40 dB(A) and the evening and night time noise criteria of  $L_{Aeq,1hour}$  28 dB(A) that were calculated using the *Planning for Noise Control Guideline* (EPA 2004). As a result the proponent considered that no noise mitigation would be required for the project. However, noise mitigation measures are proposed in the draft EM plan and these are discussed in this section of the EIS assessment report. The EIS stated that at the noise sensitive receptors, the excavators, haul trucks and dozer would potentially be the most dominant noise sources.

In the response to submissions dated 29 August 2011 and in the EIS Addendums dated January and February 2012, the proponent presented a revised transport proposal, Rail Option B1, which became the preferred transport option for the project. Option B1 involves a light vehicle access road from the east and the construction of a rail spur that extends from the Peak Downs – Blackwater branch approximately 9 km to the southwest of the project to the Washpool MIA.

The proponent stated that for Rail Option B1, the nearest noise sensitive receptors would be located greater than 7 km from the rail line, and that this option would result in lower noise levels for all sensitive receptors than the other options previously assessed in the EIS. At the nearest sensitive receptor, the  $LA_{max}$ <sup>8</sup> is predicted to be less than 50 dB(A). Also, with an average of one train a day, the rail noise levels are estimated to be in the order of  $L_{Aeq}$ <sup>9</sup> 40 dB(A), which complies with the Environmental Protection (Noise) Policy 2008's  $LA_{max}$  87 dB(A) and  $L_{Aeq}$  65 dB(A) noise criteria.

Adequate mitigation measures are proposed in the draft EM plan to ensure noise impacts will meet the relevant noise criteria, including:

- where possible, noisier operations will be scheduled in-pit at night or during daylight hours only
- proper maintenance and operational procedures will be undertaken to minimise nuisance noise emissions from equipment, including proper servicing and maintenance of exhaust systems on mine equipment
- all formal complaints will be promptly investigated to determine the source of the nuisance noise, and where appropriate, noise monitoring will be conducted at the affected sensitive receptor, and as required, noise amelioration solutions will be investigated and implemented
- where practicable, topsoil dumps or overburden material will be used as a noise barrier between the active mine and noise receptor locations
- additional noise amelioration methods for equipment will be investigated and implemented if deemed cost effective
- the speed of heavy vehicle traffic on the haul roads will be limited
- a proactive noise monitoring program will be implemented to cover the project site
- after hours contact details for immediate complaints response will be provided to any new near neighbours, where necessary.

The low frequency noise character from the project has been assessed in the EIS. The modelling results show that the un-weighted noise levels from the mining operation will be below 50 dB criterion at the surrounding noise sensitive receptors during the entire project life. The proponent considers that noise mitigation will not be required.

<sup>7</sup>  $L_{Aeq,1hour}$  means the equivalent continuous A-weighted sound pressure level of the residual noise determined over a time interval of 1 hour.

<sup>8</sup>  $LA_{max}$  means the highest A weighted noise level recorded during a noise event

<sup>9</sup>  $L_{Aeq}$  means the equivalent continuous A-weighted sound pressure level

However, the proponent stated that if the internal noise level exceeds 50 dB(lin) and the dB(Lin) measurement exceeds the A-weighted measurement by more than 15 dB, a further assessment is recommended.

The EIS stated that blasting will occur once per week during daylight hours. The nearest sensitive receptor to blasting activities will be in excess of 5 km. The proponent stated that the airblast and vibration criteria will be met at all sensitive receptors and with the following impacts:

- vibration criterion of 5 mm/s for 9 out of 10 blasts should be met at approximately 1,050 m from the blast.
- airblast overpressure criterion of 115 dB(Lin) for 9 out of 10 blasts should be met at approximately 1,100 m from the blast.

Adequate mitigation measures were proposed in the draft EM plan for the management of airblast overpressure and vibration, including:

- the maximum instantaneous charge will be reduced by using delays, appropriate hole diameter, etc
- the burden and spacing will be changed by altering the drilling pattern and/or delay layout, or altering the hole inclination
- the stemming depth and type will be adequate
- where feasible, blasts will be restricted to favourable weather conditions
- blasts will be monitored at sensitive locations
- near neighbours will be advised at least 24 hours in advance of each blast, and blasting times and dates will be posted on the proponent's website.

Furthermore, adequate mitigation measures are proposed in the draft EM plan to reduce mining vibration impacts, by implementing one or more of the following control options:

- blasting parameters including size and timing will be controlled to ensure compliance
- meteorological conditions will be factored into the timing and execution of blasting operations
- as required and where feasible, overburden material will be selectively placed as bunds to provide acoustic and visual shields or barriers between operations and nearby residences.

## 4.11 Nature conservation

### 4.11.1 Terrestrial Ecology

The project area includes the mine pit, mine infrastructure within the proposed mining lease, ML80164, and the transport corridors for the light vehicle access road and railway line. The EIS stated that the project area is highly disturbed, with the majority of the land historically cleared for grazing and agricultural purposes. As a result remnant vegetation is limited to riparian areas, including the Mackenzie River on the northern boundary of the project area, Burngrove Creek on the southern boundary and Coal Mine Lagoon in the western section of the project area. The EIS stated that there are no natural grasslands within the project area and the existing grasslands are dominated by Buffell Grass (*Cenchrus ciliaris*) and Soft Roly Poly (*Salsola kali*).

A three day flora survey was conducted in October 2009 at six sites across and outside the project area that were considered by the proponent as representative of the extent of vegetation communities. A five day fauna survey program was completed in October 2009 at seven sites representative of the habitat types across and outside the project area. An opportunistic fauna survey was also undertaken following the wet season in April 2010.

The former DERM's submission on the EIS raised a number of issues regarding the assessment on terrestrial ecology, including:

- maps of the project area did not include the infrastructure leases for the transport options
- the EIS provided an inadequate number of flora surveys to cover the project area
- a lack of clarity as to why some flora and fauna sampling was undertaken outside the project area
- additional flora and fauna surveys should be undertaken in the pit area that includes sampling of Regional Ecosystems, degraded grassland and high value re-growth areas

- the floristic diversity and the condition of high value regulated regrowth containing endangered REs was not described
- flora and fauna surveys were not carried out during both the wet and dry season
- details of the opportunistic survey that was undertaken following the wet season in April 2010 were not provided
- consistent terminology about the fauna survey results was not used
- a desktop review of flora and fauna up to 100 km around the project area was not undertaken
- the potential impacts on high value regrowth areas in the project area, and associated mitigation measures and offsets, were not assessed
- offsets for residual impacts to State significant biodiversity values under the Biodiversity Offset Policy (BOP) were not proposed.

In response to the former DERM's issues on terrestrial ecology, the proponent provided an adequate response that included:

- updated figures of the project area including the footprint of the transport corridor options
- clarification of the flora and fauna sampling that was conducted outside the project area
- clarification of why a dry season fauna survey was not warranted due to the lack of wetland habitat at the site
- additional information on additional flora and fauna species potentially occurring at the project area in the 100 km buffer around the project area
- results of an additional flora survey of the mine pit area undertaken in September 2011 that included 12 additional flora survey sites in the proposed mining lease, six of which were in the mine pit area and focused on mapped regional ecosystems (RE) and regrowth vegetation
- additional information on an opportunistic fauna survey that was undertaken in April 2010 after the wet season
- an additional flora and fauna habitat survey of the transport corridors (both rail and road) conducted in September 2011
- a Biodiversity Offset Strategy to address the loss of vegetation and habitat under the Biodiversity Offsets Policy.

#### **4.11.1.1 Impact on vegetation communities**

The proponent stated that mining would not impact on any remnant vegetation, but would result in the loss of 9.9 ha of regrowth vegetation containing Poplar Box regrowth (RE 11.4.2 and RE 11.5.3) and Brigalow regrowth (RE 11.4.8). The 50 m wide transport corridor (rail and light vehicle access) would impact on 4.95 ha of remnant vegetation, which includes 1.76 ha of RE 11.3.3, which is Of Concern under the *Vegetation Management Act 1999*. It would also impact on 3.02 ha of regrowth vegetation containing Poplar Box regrowth (REs 11.3.2, 11.5.3 and 11.4.7) and Brigalow regrowth (RE 11.4.8).

#### **4.11.1.2 Impacts on flora**

The proponent stated that the combined field surveys recorded a total of 121 species of plants in the project area, including 111 in the proposed mining lease and 31 in the transport corridor. The EIS stated that no flora species listed as threatened species under the Queensland Nature Conservation (Wildlife) Regulation 2006 were recorded at the mine area or transport corridor during the field surveys. The EIS assessed that due to the lack of habitat across the project area, the project is unlikely to impact on any threatened flora species.

#### **4.11.1.3 Impacts on fauna**

The Little Pied Bat (*Chalinolobus picatus*), which is listed as near threatened under the Queensland Nature Conservation (Wildlife) Regulation 2006, was recorded around Coal Mine Lagoon, and was the only animal recorded in the project area that wasn't either least concern or exotic wildlife.

The proponent stated that clearing of riparian woodlands (RE 11.3.3 and HVR 11.3.2) along the rail corridor would result in the fragmentation of two wildlife corridors including Burngrove Creek and a tributary of Mackenzie River.

Loss of up to 5.93 ha of this habitat may also impact on the Little Pied Bat, which is likely to roost in hollows of eucalypts or bloodwoods in riparian woodlands along the Mackenzie River and Burngrove Creek. The proponent proposes to minimise the width of the rail corridor at these creek crossings to minimise fragmentation and edge effects.

#### 4.11.1.4 Mitigation measures

The draft EM plan contained adequate mitigation measures to reduce the potential impacts of the project on flora and fauna values of the project site, including:

- Any areas to be cleared will have their boundaries surveyed and clearly marked by tape, pegs or other means. All site clearance will conform to the limits of the current mine plan. Particular attention will be paid to defining the boundaries of clearing where endangered and of concern regional ecosystems are present.
- All vegetation clearance will be restricted to what is required for safe operations. A plan for dealing with fauna during clearing and construction will be prepared to outline protocols for dealing with injured wildlife and other necessary actions relating to fauna.
- A flora and fauna monitoring program will be put in place to protect flora and fauna of conservation significance within and surrounding the project site. The monitoring program will be revised as required and will continue until decommissioning and final rehabilitation.
- A Weed Management Plan will be prepared for the project in accordance with the *Land Protection (Pest & Stock Route Management) Act 2002* and/or local government requirements for weeds not declared under State legislation.
- Measures to avoid fauna mortality on the project's internal and external roads will be adopted as required, including:
  - the provision of fauna crossing signs
  - minimisation of habitat loss through design and maintenance of habitat connectivity wherever possible
  - rehabilitation of disturbed areas as soon as practicable
  - traffic management including speed reduction measures, speed cameras, radars and road widening for visibility
  - employee education through inductions, training and awareness including posters, fact sheets and toolbox talks.

As a result of unavoidable residual impacts on State Significant Biodiversity Values, the proponent provided a Biodiversity Offset Strategy (the strategy) under the Queensland Biodiversity Offset Policy (BOP). The proponent stated that there are sufficient offset options available on adjacent lands to the project area that are to be acquired by the proponent. The proponent committed to providing an offsets proposal including a legally binding agreement and ecological equivalence assessment for the associated options that will be developed within four months of project approval. If ecological equivalence is not achievable for all the ecological values an offset transfer agreement will be entered into with an offset broker within 4 months of project approval. However, EHP notes that the proponent's timing of undertaking an ecological equivalence and the development of a Deed of Agreement within 4 months of project approval is not consistent with the BOP. In order to address this timing issue and meet the offset requirements, it is recommended that before issuing the draft EA, the proponent should undertake the ecological equivalence assessment of the impact area and enter into a Deed of Agreement.

The applicant should use the Ecological Equivalence Methodology located on EHP's webpage at [http://www.derm.qld.gov.au/environmental\\_management/environmental-offsets/pdf/ecological-equivalence-methodology.pdf](http://www.derm.qld.gov.au/environmental_management/environmental-offsets/pdf/ecological-equivalence-methodology.pdf). The ecological equivalence scores, including the values and extent of the values to be impacted, should be inserted into the Deed of Agreement.

#### 4.11.2 Aquatic ecology

The EIS stated that in April 2010, field surveys for the aquatic ecology assessment were undertaken at seven sites located at Mackenzie River, Burngrove Creek, Coal Mine Lagoon and a Farm Dam south of Burngrove Creek.

The former DERM's submission raised a number of issues regarding the assessment of aquatic ecology, including:

- frogs and other species relying on aquatic habitats were not been discussed in the aquatic ecology section
- water quality analysis (including physical form assessment and water quality analysis) of each of the seven study sites were missing from the aquatic ecology section.

The response to submissions dated 29 August 2011 included clarification of where the EIS discussed amphibians and other aquatic species including the Fitzroy River Turtle. However, the proponent provided an inadequate response to the issue of water quality analysis of the study sites and was requested again by the former DERM to assess this issue. The EIS Addendum dated 20 January 2012, included an adequate assessment of the water quality data obtained from the seven study sites against the aquatic environmental values.

#### **4.11.2.1 Aquatic flora**

The EIS stated that no listed or protected aquatic flora were identified in the database searches.

The macrophytes within the project area were not found to be regionally or nationally significant.

The impact on macrophyte populations is expected to be small given the low species abundance and diversity, limited distribution and their low environmental value.

#### **4.11.2.2 Aquatic fauna**

The EIS stated that the aquatic fauna within the project area are low in diversity and abundance. Fish populations within the project area are strongly limited by the availability of suitable aquatic habitat and permanent water (farm dams where permanent water exists and Coal Mine Lagoon). The fish species composition was lower than expected for ephemeral streams. No threatened fish species were reported in the database searches or found during the site surveys. The EIS stated that because all the fish species expected within the project area are found in other areas of the Mackenzie River catchment, the impact on fish is expected to be very low.

The EIS stated the impacts on the macro-invertebrate populations within the project are also expected to be low, given that the surveys indicated an overall low taxonomic diversity. None of the recorded macro-invertebrate species were found to be regionally or nationally significant.

The proponent undertook a pilot study on the possible presence and nature of stygofauna occurring in the groundwater likely to be affected by the project. From the pilot study, no stygofauna were identified within the project area.

#### **4.11.2.3 Fitzroy River Turtle and White-throated Snapping Turtle**

The Fitzroy River turtle is listed as vulnerable under the Queensland Nature Conservation (Wildlife) Regulation 2006; the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and the International IUCN Red List of Threatened Species 2007 (IUCN Red List 2007).

The White-throated Snapping Turtle is least concern wildlife under the Nature Conservation (Wildlife) Regulation 2006; and is not listed under the EPBC Act or the IUCN Red List 2007. The White-throated Snapping Turtle is endemic to Australia and has been recorded in the Fitzroy, Raglan, Burnett and Mary River drainages in central and southern Queensland.

Although the White-throated Snapping Turtle is listed as least concern under the Queensland *Nature Conservation Act 1992* (NC Act), it is ranked as a high priority for conservation under the EHP Back on Track species prioritisation framework. Consequently, the proponent has considered the potential impacts of the project on the White-throated Snapping Turtle together with the Fitzroy River turtle and are discussed further in section 4.12, Matters of National Environmental Significance, of this EIS assessment report.

#### **4.11.2.4 Mitigation measures**

The EIS provided the following adequate mitigation measures to minimise impacts on aquatic flora and fauna:

- the overall area of disturbance will be limited
- clean run-off from undisturbed areas will be diverted away from diverted mining areas
- sedimentation dams will be constructed prior to land disturbance to capture run-off from disturbed areas
- components of the water management system will be constructed during the dry season, where possible



- clean water diversions will be revegetated to minimise potential erosion
- all chemical and fuel storage areas will be appropriately bunded
- spill prevention and response procedures, equipment and training will be provided
- all putrescible and hazardous wastes will be disposed off-site at a licensed facility
- sewage and other wastewaters will be appropriately treated prior to on-site disposal or reuse, or else collected for offsite disposal at a licensed facility
- the proposed haul road crossing over Burngrove Creek will be designed, constructed and operated to prevent any potential impact on aquatic flora and fauna.

## 4.12 Matters of National Environmental Significance

The project was referred (2009/5240) to the then Commonwealth Department of Environment, Water, Heritage and Arts (DEWHA) in December 2009. On 16 February, 2010, DEWHA determined the project to be a controlled action under sections 18 & 18A (Listed threatened species and communities) due to the potential impact the project may have on the Mackenzie River, which provides habitat for the listed vulnerable Fitzroy River Turtle.

### 4.12.1 Impact on vegetation communities

The EIS stated that no EPBC threatened ecological communities occur within the proposed mining lease or transport corridors. The EIS stated that the small patches of high value regrowth (HVR) containing RE 11.4.8 do not meet the EPBC criteria for the Brigalow threatened ecological community due to lack of Brigalow in the canopy and understorey tree layers and the dominance of Buffell Grass in the ground layer.

### 4.12.2 Impacts on listed species of flora and fauna

The EIS stated that no nationally significant flora and fauna species were recorded in the project area.

The assessment of potential impacts on EPBC listed fauna species were based on how much potential habitat would be cleared from the mine and transport corridor. Table 4 summarises the assessment.

**Table 4 Summary of potential impacts on EPBC listed threatened fauna**

Species	Status	Likelihood of occurrence	Potential Impact
<b>Reptiles</b>			
Ornamental Snake	Vulnerable (EPBC Act and NC Act)	Likely	The project will not clear any potential habitat for the Ornamental Snake. Potential habitat for the Ornamental Snake occurs outside the proposed mining lease in a patch of Brigalow woodland (RE 11.4.9) surrounding a billabong adjacent to the north-eastern boundary of the proposed ML. Impacts on this community will be avoided.
Yakka Skink	Vulnerable (EPBC Act and NC Act)	Possible	The project will not clear any potential habitat for the Yakka Skink. Potential habitat for the Yakka Skink occurs outside the proposed mining lease in a patch of Brigalow woodland (RE 11.4.9) adjacent to the north-eastern boundary of the proposed mining lease. Impacts on this community will be avoided.
Brigalow Scaly foot	Vulnerable (EPBC Act and NC Act)	Possible	The project will not clear any potential habitat for the Brigalow Scaly-foot. Potential habitat for the Brigalow Scaly-foot occurs outside the proposed mining lease in a patch of Brigalow woodland (RE 11.4.9) adjacent to the north-eastern boundary of the proposed mining lease. Impacts on this community will be avoided.
<b>Birds</b>			
Squatter Pigeon	Vulnerable (EPBC Act and NC Act)	Likely	The project will clear approximately 9.48 ha of potential habitat for the Squatter Pigeon comprising remnant and regrowth grassy eucalypt woodlands. This is unlikely to significantly impact on the Squatter Pigeon if present, as it frequently occurs in disturbed, cleared areas. This species is highly mobile and will be able to

			continue to use surrounding similar habitat.
Australian Painted Snipe	Vulnerable (EPBC Act)	Possible	The project will not impact on potential habitat for the Australian Painted Snipe within the project area which comprises Coalmine Lagoon and flooded Belah wetlands located in south eastern corner of the proposed mining lease.
Star Finch (eastern)	Endangered (EPBC Act and NC Act)	Possible	The project will clear approximately 5.93 ha of remnant potential habitat for the Star Finch, comprising remnant and regrowth riparian woodlands along Burngrove Creek and a tributary of the Mackenzie River.  This is unlikely to have a significant impact on the Star Finch if present, as the habitat is sub-optimal and the species would be able to continue to use suitable habitat along this riparian corridor.

Source: Washpool Coal Mine Project EIS (9 May 2011), table 12-19 and accompanying text

The EIS stated that two migratory species listed under the EPBC Act are present in the project area, Rainbow Bee-eater and Great Egret. A further eight migratory species are likely to occur, and one possible to occur based on presence of suitable habitat. The likelihood of migratory species occurring at the project site is listed in Table 5.

**Table 5 - Potential EPBC listed migratory fauna**

Species	EPBC Status	Likelihood of occurrence
<b>Wetland Birds</b>		
White-bellied Sea-eagle ( <i>Haliaeetus leucogaster</i> )	Migratory	Likely
Great Egret ( <i>Ardea alba</i> )	Migratory	Present
Cattle Egret ( <i>Ardea ibis</i> )	Migratory	Likely
Latham's Snipe ( <i>Gallinago hardwickii</i> )	Migratory	Likely
Australian Cotton Pygmy-goose ( <i>Nettapus coromandeli anus albipennis</i> )	Migratory	Likely
Painted Snipe ( <i>Rostratula australis</i> )	Migratory, Vulnerable	Possible
<b>Terrestrial Birds</b>		
White-throated Needletail ( <i>Hirundapus caudacutus</i> )	Migratory	Likely
Rainbow Bee-eater ( <i>Merops ornatus</i> )	Migratory	Present
Black-faced Monarch ( <i>Monarcha melanopsis</i> )	Migratory	Likely
Satin Flycatcher ( <i>Myiagra cyanoleuca</i> )	Migratory	Likely
Fork-tailed Swift ( <i>Apus pacificus</i> )	Migratory	Likely

Source: Response to submissions (29 August 2011), table 10 and accompanying text

The EIS stated that the migratory birds are highly mobile and may potentially occur within the project area at Coalmine Lagoon, flooded Belah wetlands and Burngrove Creek, depending on the season and amount of rainfall. However, the EIS stated that the project area is not known to contain any area of important habitat for migratory wetland or terrestrial birds. Vegetation around dams, lagoons and flooded wetlands has been degraded by cattle trampling and very little groundcover remains. Consequently, the EIS stated that the project will not result in a significant impact on a migratory wetland or terrestrial bird.

### 4.12.3 Fitzroy River Turtle and White-throated Snapping Turtle

The EIS stated that potential impacts on the Fitzroy River Turtle and White-throated Snapping Turtle are expected to be low, given that the habitat would likely be limited to the Mackenzie River, Coal Mine Lagoon and farm dams that the project would have no directly impact on. The EIS recognised that the project has the potential to impact on nesting sites of Fitzroy River Turtle and White-throated Snapping Turtle due to mining and the placement of a levy adjacent to Coal Mine Lagoon. Consequently, the proponent has developed a draft Turtle Management Plan for implementation during construction and operation to minimise negative impacts on the nesting environment. Mitigation measures to be used if nests are discovered are also detailed within the Turtle Management Plan.

The draft Turtle Management Plan discussed the potential of the project to impact on the Fitzroy River Turtle and White-throated Snapping Turtle through:

- mine associated water entering waterways as discharge or runoff

- vegetation clearing and earthworks within or adjacent to waterways
- construction of levee bank
- operation of vehicles and equipment
- construction of vehicle creek crossings
- obstruction of flow and turtle passage

At the time of preparation of the EIS, the presence of the Fitzroy River Turtle and White-throated Snapping Turtle and the extent of nesting habitat within the project area was not yet known and was still to be confirmed through a field survey. The proponent provided a commitment to undertake further surveys during the nesting season to assess the presence of the Fitzroy River Turtle and nesting habitats within the project area, including survey sites in the Mackenzie River, Burngrove Creek and Coal Mine Lagoon. It is recommended that the environmental authority contain a condition requiring the proponent to undertake turtle nesting surveys prior to mining during October and November for Fitzroy River Turtle and during May and June for White-throated Snapping Turtle. The draft Turtle Management Plan must then be amended and updated according to the results of this additional field work.

The proponent provided adequate mitigation measures in the draft Turtle Management Plan, which are described below.

*Vegetation clearing, earthworks, including levee construction, and creek crossings*

The Mackenzie River anabranch, Coalmine Lagoon, and all areas within 60 m of a watercourse (which is the maximum recorded distance of a White-throated Snapping Turtle nest from the water's edge) should be inspected by appropriately qualified professionals prior to vegetation clearing and earthworks to assess whether there is suitable habitat for Fitzroy River Turtle and White-throated Snapping Turtle within the waterway, or nesting habitat on the banks, or whether the species are present. Where nesting banks are identified, or are suspected as being present, works in the vicinity should be halted and access to the area restricted by temporary or permanent fencing. A suitably qualified turtle specialist should then be engaged to assess the area for the presence of Fitzroy River Turtle and / or White-throated Snapping Turtle. If the presence of Fitzroy River Turtle and / or White-throated Snapping Turtle is confirmed, a localised impact assessment that incorporates recommendations from the turtle specialist and alternative work plans should be completed for the area. The work required in the area should be reviewed and revised in accordance with the localised impact assessment. Where the presence of Fitzroy River Turtle and/or White-throated Snapping Turtle nesting habitat is confirmed, the following management actions will be undertaken to offset the loss of other potential nesting habitat on the site:

- baits will be set for predators (e.g. wild dogs, foxes and pigs) in the mine lease area
- confirmed nests will be covered with protective mesh, as used by EHP
- the nesting area, down to the water, will be kept free of weeds
- livestock will be excluded from the nesting area
- vehicle access to the river will be restricted for 100 m upstream and downstream of the confirmed nest location.

The risk of sedimentation in waterways from vegetation clearing and earthworks will be reduced by:

- avoiding areas of high value turtle habitat
- developing and implementing an erosion and sediment control management plan
- constructing sediment dams prior to vegetation clearing and other earthworks
- minimising the amount of vegetation clearing and earthworks at each stage of the operation
- undertaking all clearing and earthworks for creek crossings in the dry season wherever possible
- not locating creek crossings adjacent to or over any permanent waterholes.

If construction must be undertaken during the wet season, impacts associated with construction of the crossings will be minimised if:

- the workspace is isolated, irrespective of if there is an isolated pool or flowing water

- 100% of the flow is maintained downstream by using appropriately sized pumps.

#### *Maintenance of turtle passage*

Potential impacts on turtle passage may be minimised by maintaining an open, connected channel at all times during construction and operation. Where culverts are used, impacts will be minimised through:

- installation at the driest time of year (preferably in the dry creek bed, avoiding pools). During the wet season, impacts may be minimised where isolation methods are adopted (see above)
- regular maintenance, such as, the removal of excessive debris or plant growth that may impede passage.

#### *Fuel Spills*

Risks associated with the spillage of fuels and other contaminants can be substantially reduced, if not eliminated, where:

- vehicle maintenance areas, portable refuelling stations and storage of fuels, oils and batteries are situated within bunded areas, designed and constructed in accordance with Australian Standards
- all spills of contaminants over 20 litres are reported to the Environmental Officer (or delegated person)
- appropriate spill containment kits are available, and used for the cleanup of spills in the field. The kits should contain equipment for clean up of both spills on land or in dry creek beds, and spills to water (such as floating booms).

It is recommended that the environmental authority include conditions requiring the proponent to implement the above mitigation measures for the Fitzroy Turtle and White-throated Snapping Turtle.

## 4.13 Cultural heritage

The EIS adequately addressed the TOR with respect to both Indigenous and non-Indigenous cultural heritage issues.

The EIS stated that cultural heritage investigation and management agreement (CHIMA) has been developed between the Kangoulu People #2 and the proponent in accordance with Part 7 of the *Aboriginal Cultural Heritage Act 2003*, and was approved as a cultural heritage management plan (CHMP) by the former DERM. The CHIMA details the processes and procedures to be undertaken to manage any Aboriginal cultural heritage which may be impacted by the project, and includes provisions for the ongoing management of cultural heritage throughout the life of the project. The CHMP satisfies the statutory requirements for management of Indigenous cultural heritage.

The proponent conducted searches of the Queensland Heritage Register and National Trust of Queensland that revealed no items or places of non-Indigenous or historical cultural heritage significance registered within the project area. The proponent undertook discussions with the Blackwater Historical Society that confirmed that no historical cultural heritage places or objects are likely to be present within or in the near vicinity of the project area.

The former DERM advised the proponent that section 4.9.2.2, *Non-indigenous historical heritage*, of the TOR was not adequately addressed in the first version of the EIS with regard to the assessment of historical background. In response to the former DERM's issue on Non-indigenous heritage the proponent provided an adequate historical heritage assessment.

The proponent stated that no places were listed on the National Heritage List, Commonwealth Heritage List, Register of the National Estate, Queensland Heritage Register, the former DERM Historic Inventory or in the local planning scheme for the study area. The study area was not previously subject to historical heritage survey.

Historical heritage sites that were identified during the field survey of the project site, included:

- timber constructed stock yards, windmill, dam, trough and water tank remains constructed in the early 1970's by the current land owners
- ringbarked trees, dating to the 1930s.

The former DERM advised the proponent that the draft EM plan should include a process for meeting requirements of the *Queensland Heritage Act 1992* (QH Act) in the circumstances of any incidental discoveries of cultural heritage significance. In the amended draft EM plan (January and February 2012) the proponent included an adequate process for complying with Part 9 of the QH Act in the event that a relevant archaeological artefact is

discovered during construction and operations. The process includes stopping work in the vicinity of the discovery, erecting fencing or designating the site a no go zone, assessing and recording the find and reporting the discovery.

## 4.14 Social issues

The project is located in the Duaringa statistical local area of the Central Highlands Regional Council. The closest regional centres are Blackwater and Emerald.

At 30 June 2009, Blackwater and Emerald had an estimated residential populations of 5420 people and 13 118 people respectively (ABS, 2010).

In 2006, Blackwater and Emerald had unemployment rates at 2.3% and 1.9% respectively, similar to unemployment levels in the Duaringa statistical local area, at 2.1% and the Central Highlands Regional Council area at 2.3%. The EIS stated that this low unemployment is indicative of a relatively small labour pool from which workers may be sourced for the project and other developments.

The construction phase of the project is expected to employ a peak workforce of approximately 307 contractors. The mine will require up to 387 full time employees during the 15 to 20 year operation phase, with an average workforce of 364 people.

The EIS stated that based on the highly competitive labour market in the local area, it is expected that the majority of the project's workforce will commute from Emerald, Rockhampton or other regional centres to a workers village, in a Bus-In-Bus-Out arrangement.

For the EIS, the proponent undertook a social impact assessment (SIA) that was developed to comply with the requirements of the *Sustainable Resource Communities Policy: SIA in the Mining and Petroleum Industries, 2008*. The Social Impact Assessment Unit, previously in DEEDI and now in the Department of State Development Infrastructure and Planning, is the lead agency on social issues and assessed the SIA for the project.

The proponent undertook stakeholder consultation to identify social issues from the project. Stakeholders included local and State government, affected landholders and industry or community parties. Initial stakeholder consultation occurred between 19 July 2010 and 5 August 2010, which identified community values, and existing or project issues and impacts. A workshop occurred on 28 October 2010 with key stakeholders to discuss and negotiate proposed mitigation strategies and action plans.

Social issues that were identified as part of proponent's SIA assessment and also raised in submissions on the EIS, included:

- significant competition for skilled and unskilled labour due to the level of concurrent resource development
- development of a 'two-stream' economy, with mine workers earning significantly higher wages than those employed in other sectors
- declining housing affordability, particularly in Blackwater
- increasing cost of living, forcing lower income groups out of local townships
- limited health service capacity, and difficulty in recruiting doctors and nurses in the Central Highlands Region
- lack of social infrastructure to support an increased resident community, particularly in Blackwater
- limited police service capacity, particularly with regard to escort of oversized vehicles
- traffic congestion and road surface damage through movement of construction materials and mine products, as well as workforce commuters
- community resistance to an additional 'camp-style' accommodation development, particularly in Blackwater
- lack of integration between mine workers in camps and the local resident community
- limited investment of time and money by mine workers into local communities and activities.

The proponent stated that potential social impacts were assessed according to their nature, duration, extent, severity and likelihood. The major social impact identified from the SIA was the social impact on housing and work force accommodation. An Accommodation Options Assessment was presented in the EIS. The EIS assumed that the majority of workers will be accommodated in a purpose built workers' village which will be preferably located in

close proximity to Blackwater, on land leased or purchased by the proponent otherwise located within the proposed mining leases (80176 or 80177).

The proponent developed a social impact management plan (SIMP) for the project that was reviewed by the Social Impact Assessment Unit. The SIMP identified five broad impact categories, which include employment and training, local business development, community services and infrastructure, workforce health and wellbeing, stakeholder engagement and community wellbeing. Action plans have been developed for each of the broad impact categories. Each action plan identifies key management measures that respond to and identify indicators to measure performance. The SIMP stipulates that a Community Liaison Group will be established for disseminating information throughout the life of the project. The Community Liaison Group will encourage collaborative relationships between the proponent and key stakeholders.

Issues raised by the Social Impact Assessment Unit in its submission on the EIS, included:

- clarification on the SIMP monitoring and advice strategies including what plans there are to form a community reference group who can provide input into future reviews of the SIMP
- the accommodation option assessment should be included as an action in the management plan of the SIMP
- include details in the housing assessment of how the proponent intends to manage and monitor housing impacts
- SIMP development should be a co-operative activity between local and State government and community stakeholders.

In the response to submissions (29 August 2011), the proponent provided an inadequate response to all the above issues and was advised to address the following:

- the SIMP should include monitoring, reporting and review of accommodation issues
- any amendments of the SIMP should be agreed on in consultation with the coordinating liaising group
- the SIMP should address the requirements of the Queensland Major Resource Projects Housing Policy that includes the proponent working with local communities, councils, unions and the State government to make sure that the liveability and sustainability of towns is protected and that workers have choice about where they live.

In the EIS Addendums (January and February 2012), the proponent provided an adequate response to issues raised by the Social Impact Assessment Unit, and added the following adequate actions in the SIMP:

- upon selection of a contractor, the proponent will develop a detailed accommodation strategy for the Project, in line with the requirements of the Major Resource Projects Housing Policy, and in consultation with the SIA Unit
- the proponent will contribute to housing availability and affordability monitoring undertaken by the Department of Communities

## 4.15 Health and safety

The Health and Safety section of the EIS adequately addressed the TOR with respect to the potential impacts of the Washpool project on the health and safety of the community. Occupational health and safety matters on the worksite are covered by other legislation and are not subject to approvals under the EP Act.

The EIS discussed the project's potential to impact on community health, safety and quality of life in the following areas:

- health
  - contamination of water bodies due to contaminant discharge
  - contamination of surface and groundwater resources due to ineffective waste management
  - uncontrolled breeding of disease vectors, such as mosquitoes and biting midges
- safety
  - traffic incidents with mine vehicles off site

- ineffective security and site demarcation leading to access to site by the community
- workplace health and safety impacts to employees during construction and operation
- quality of life
  - nuisance of air emissions, dust and noise.

The EIS presented a summary of potential health risks to the community, and they are presented in Table 6 below.

**Table 6 - Summary of risks to community health, safety and quality of life**

Potential impact	Risk to nearby receptors	Comment
Odour	Low	No major gas or vapour sources. No major odour sources—the site Sewage Treatment Plant is not likely to produce odours if managed properly.
Dust and particulates	Low	The majority of particle matter levels at nearby receptors will be within government air quality criteria, with the exception of annual total suspended particles levels for receptor 8 for year 10 of mining.
Noise	Medium	Noise will not exceed necessary criteria outside of the project site.
Pests	Low	No increase in pests due to construction or operations.
Waste	Low	Construction and operational waste streams will be managed through established methods.
Chemicals	Low	Construction and operational chemicals will be managed through established methods.
Groundwater quality	Low	Low potential for acid mine drainage. No registered groundwater users within 5 km radius of site. Very low likelihood of chemical and waste spills infiltrating to groundwater.
Surface water quality	Low	Low potential for acid mine drainage Mine water discharges restricted to flood conditions. Very low likelihood of chemical or wastewater spills to waterways.
Traffic	Low	Existing low traffic area. Site will have dedicated mine access road.

Source: Washpool Coal Mine Project EIS (9 May 2011), table 17-1 and accompanying text

Adequate mitigation measures are proposed to address health and safety issues through:

- the draft EM plan containing mitigation measures to address potential impacts on the local community relating to air, noise, water quality and waste
- the SIMP having measures to address community health and safety, including:
  - providing a bus service for staff to minimise impacts on road safety
  - designing and implementing a drug and alcohol management policy, and undertaking regular testing on site
  - designing and implementing a fatigue management policy in close co ordination with Queensland Police and Emergency Services
  - developing and implementing a traffic control plan to reduce road safety impacts on the community
- the EIS proposing satisfactory measures to control vermin and mosquitoes.

## 4.16 Economy

The EIS stated that the project is located in the Duaringa Statistical Local Area of the Central Highlands Regional Council (CHRC) area, which has an economy that relies heavily on the surrounding coal mines, with seven open cut coal mines situated in close proximity to Blackwater. The broader area surrounding the project site generally supports broadacre agricultural activities such as grazing and cropping.

Emerald is the primary economic centre for the Central Highlands Regional Council, providing key services for regional communities and surrounding mining uses, as well as agricultural industries including cotton, citrus grape and grain farming.

The EIS stated that the project will contribute to the State economy through royalties of approximately \$26 million per year.

The EIS stated that an initial capital investment of approximately \$320 million will be required to bring the project to full production, with operational expenditure estimated to be approximately \$200 million per year for the life of the mine.

The proponent stated that total potential expenditure in local businesses by project workers during the construction phase is approximately \$1 million. Based on a ramping up of operational workforce numbers, to a total of 378 in 2020, the additional spending by staff over the period from 2013 to 2027/2032 equates to between \$13 million and \$46 million.

Resources required for the upkeep and running of the workers village will result in an additional \$4 million to \$14 million being spent in the Central Highlands Region over this same period.

The proponent stated that the spending in local businesses by project employees and for resourcing will have flow-on effects to the local and regional economies. The EIS stated that in the short-term, local businesses will enjoy increased profitability and could potentially be required to hire additional employees. In the long-term, the project will assist in providing new business opportunities, such as expansion of existing businesses and attracting new businesses to open in the region.

The EIS stated that the project would have a substantial impact on the local workforce. The Central Highlands Region is characterised by a relatively tight labour market, a low unemployment rate and a shortage in skilled labour. Therefore, it is likely that the majority of both the construction and operational workforces would be sourced from outside of the CHRC area.

The proponent proposed adequate mitigation measures in the EIS to minimise any negative impacts of the project on the CHRC economy including:

- working with the Central Highlands Regional Council, Central Highlands Development Corporation, and other local businesses to support sustainable regional development within the Central Highlands
- continuing to coordinate its business planning to ensure agricultural activities are properly integrated with mining activities within the project area, throughout the life of mine by potentially allowing cattle to graze on pasture that is not required by the mining options or has been rehabilitated
- liaising with the Queensland Mining Industry Skills Centre in Blackwater and local campus of the Central Queensland Institute of TAFE in Blackwater to assist with regional skills development and staff attraction
- intending to source the additional workforce from local and other external areas depending on:
  - the specific skills of the advertised position
  - the status of the labour market at the time
  - the trainability of the advertised position
- having a commitment in the SIMP to compile a Local Industry Participation Plan (LIPP) for the project.

## 4.17 Hazard and risk

The EIS presented an acceptable risk assessment for the project that showed the health and safety risk profile for the project is generally 'Low' or 'Moderate' with the following exceptions that have been assessed as 'High-Extreme' risk:

- safety risks from high rock fall
- safety risks from heavy and light vehicle interaction
- blasting
- contact with electricity

The EIS summarised key hazards identified with the construction, operation and decommissioning phases, along with appropriate mitigation measures:



- *equipment* - vehicles and equipment will be operated within the manufacture's specification. All vehicles and equipment will be maintained and serviced on a regular basis. Procedures will be developed as part of the site's safety management system to inspect all vehicles coming onto the site
- *vehicle collision and driving conditions* - collision between vehicles have the potential to cause serious injury to operators and passengers. The proponent proposes satisfactory measures to reduce the risk of vehicle collision, including:
  - workers operating vehicles on site will be trained and licensed
  - speed limits, driving conditions and site based driving procedures will be used
  - all vehicles will be fitted with radios for two-way communication
  - watering of on-site roads will be undertaken regularly to suppress dust and improve visibility
  - adequate night lighting through the provision of lighting towers and vehicle headlights will be provided to ensure night operating and driving conditions are safe
  - a traffic management plan will be designed and implemented
  - haul roads will be designed to comply with regulatory requirements and roads will be graded to an adequate and safe level of operation for heavy and light vehicles
- *fuel storage* - fuel storage on site will be predominantly diesel, which presents a relatively low combustion risk and moderate environmental risk. Ignition sources will be controlled to avoid fire involving bulk fuel oil. Fire fighting facilities will be provided at fuel storage facilities. All fuels will be stored and handled in accordance with AS 1940:2004
- *blasting and misfires* - blasting creates a number of potential risks such as dust, noise, vibration and flyrock and air-blast effects. Proper stemming will be used in the preparation of charges and appropriate charge ratios will be used to limit the amount of flyrock produced by a blast. Blasting operations will be carried out by an explosive contractor, which has an established record of operation in the mining industry and adherence to the Australian Explosives Manufacturers Safety Committee Code of Practice. The requirements of the Coal Mining Safety and Health Regulation 2001 and AS 2187.2:2006 will be applied to reduce the incidence of misfires
- *high voltage exposure* - electricity use from mine lighting, the CHPP and electrical operation of infrastructure will require the use of high voltage. Specialist electrical engineers will undertake the construction of 66 kV power lines, the mine site and the CHPP reticulation systems, using approved codes of practices and procedures. There will be specific and detailed standard operating procedures implemented to address the safety risks posed by high voltage exposure
- *spontaneous combustion of coal stockpile* - the issue of spontaneous combustion at the project may occur and management systems will be developed to minimise the risk of spontaneous combustion of coal. This will include a detailed risk assessment prior to stockpiling begins, appropriate management of stockpiles (moisture, height, time stockpiles) and ongoing monitoring
- *transportation* - licensed transporters operating in compliance with the Australian Dangerous Goods Code (NTC 2008) will undertake the transport of dangerous goods to the project site
- *security* - all areas with high risk of a security breach or unauthorised public access to areas such as the magazine storage and electrical transformers, will be protected by a 1.8 m high chain fence topped with barbed wire, otherwise standard fencing will apply. Prior to being given access to the project site, visitors will complete a mandatory registration and an environmental, health and safety induction.

A submission by the Department of Community and Safety (DCS) on the response to submissions (August 2011) raised a number of issues with hazard and risk, including:

- the emergency management plan to include planned evacuation routes and strategies
- assessment of bushfire impacts should be undertaken for the project
- proper mine management in relation to geotechnical analysis and monitoring of slope stability within the mining operations
- implementing a fatigue management plan and a Bus-In-Bus-Out (BIBO) strategy for workers

- engaging with the Queensland Fire and Rescue Services on fire system designs, procedures for emergency management and training and the provision of a dedicated paramedic service.

The EIS Addendums (January and February, 2012) provided an adequate response to the above issues.

## 4.18 Rehabilitation

The project would result in permanent alterations to the environment. The following main disturbance areas, would require rehabilitation:

- out-of-pit waste rock dumps
- in-pit waste rock dumps
- final voids
- flood protection levee
- dams not required for post mining land use
- infrastructure areas not required by the relevant landowner, such as haul roads, access road, rail spur, and the mine industrial area.

The EIS stated that the objective of the rehabilitation strategy is the creation of stable final landforms that are compatible with the surrounding landscape and the proposed final land use. Stable landforms would be established following mining, using soils capable of supporting vegetation communities adapted to the local environment. The stability of the post-mine landform will be achieved by applying rehabilitation practices. The disturbed land will be rehabilitated to a condition that is self-sustaining or to a condition where the maintenance requirements are consistent with the post-mining land-use.

The following adequate rehabilitation control strategies will be implemented to achieve the environmental protection objectives for land:

- a Final Land-Use and Rehabilitation Plan will be designed and submitted to EHP for acceptance within twelve (12) months of the commencement of mining
- essential pre-mining activities, such as vegetation removal and topsoil salvage will continue to be scheduled within the mine plan for the project
- the project's rehabilitated land forms will incorporate practical drainage designs to effectively manage surface water run-off and minimise the potential for erosion
- mine planning for the project will incorporate practical landform designs to minimise erosion and enhance long term stability
- sampling and testing surface water management structures associated with spoil dumps will continue to be conducted to confirm the project's low risk of acid rock drainage from mine waste materials
- sodic or dispersive materials will not be placed near the surface of the spoil dumps or within the plant root zone
- topsoil will be returned to rehabilitation areas at a thickness of no less than 250 mm, and as required, ripping will be conducted to enhance surface water infiltration and to reduce mechanical impedance for improved root growth
- active weed and pest control strategies will be implemented throughout the life of the project, to improve the current environmental condition of Burngrove Creek and Coalmine Lagoon
- the vegetation performance indicators will be monitored against the acceptance criteria to determine rehabilitation success over time for eventual progressive surrender or to identify areas that may require maintenance
- disturbed areas will be progressively rehabilitated as they become available, using rehabilitation procedures appropriate to the type of disturbance and designed to achieve the proposed final land use
- erosion control and water management measures will be progressively implemented over the life of the project

- grazing trials will be conducted within the project's rehabilitated pasture areas to establish sustainable farm management practices for eventual long term productive use.

The decommissioning and final rehabilitation of the project site will occur on a staged basis over several years. A contaminated site assessment will be carried out as part of the Final Rehabilitation Report that is required for full or partial surrender of the project's environmental authority and mining leases.

The following adequate decommissioning strategies will be implemented at the project:

- all mine roads will be rehabilitated, unless otherwise agreed with the subsequent landowner and approved by the regulator
- all water dams not required for long term water management will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and approved by the regulator
- all major infrastructure, including the CHPP, will be decommissioned and removed off site
- concrete pads will be covered with benign waste rock or ripped and removed, then topsoiled and revegetated
- other facilities, including workshops and warehouse, will be decommissioned and removed, unless otherwise agreed with the subsequent landowner and approved by the regulator.

The proposed final landform would consist of waste rock dumps, final voids and any essential or long term water management structures, such as contour banks and rock-lined waterways on dump slopes, and sediments dams and environmental dams along critical flow paths.

The final voids will be left in a condition that is geotechnically stable and doesn't pollute the surrounding environment. Bunds and/or fences will be constructed along the crests of the voids to prevent access by vehicles, people and animals. Completion criteria for the final voids will be refined prior to mine closure.

The proponent commits to developing a Mine Closure Plan at least five years before cessation of the project. This document will address all key closure issues and will outline an integrated risk-based management approach for sustainable closure of the project.

## 5 Adequacy of the environmental management plan

The latest EM plan submitted as part of this EIS does not meet the content requirements under section 203 of the EP Act. It is a legislative requirement that environmental commitments and protective objectives be included in the EM plan. These must have control strategies assigned and measurable indicators to ensure the environmental objectives are achieved.

A revised EM plan incorporating the requirements previously outlined in this report and set out in Appendix A, should be prepared for the purpose of assessment under the environmental authority process pursuant to Chapter 5 of the EP Act.

## 6 Suitability of the project

EHP has considered the TOR, the submitted EIS, all submissions on the submitted EIS, and the standard criteria. The submitted EIS has not identified impacts of sufficient magnitude to prevent the project from proceeding.

## 7 Recommended conditions

Section 59 of the EP Act states that this EIS assessment report must recommend any conditions on which any approval required for the project may be given. However, section 202 of the EP Act states it is the purpose of the submitted EM plan to propose environmental protection commitments to help the administering authority prepare the draft environmental authority for the application. As the submitted EM plan is not yet adequate and must be revised and resubmitted, there was insufficient information to enable this EIS assessment report to be able to recommend a complete set of draft conditions for the draft environmental authority. Nevertheless, section 4 of this EIS assessment report has recommended several areas where conditions should be developed for inclusion in the

draft EA. Also Appendix C includes comments on the proposed surface water conditions. The environmental authority will be drafted after the proponent has submitted a satisfactory EM plan.

## 8 Completion of this EIS process

Once this EIS assessment report has been approved by the delegate for the chief executive, the giving of this assessment report to the proponent completes the EIS process.

### Approved by

SIGNED

10 May 2012

Signature

Date

Lindsay Delzoppo  
Director, Statewide Environmental Assessments  
Department of Environment and Heritage Protection  
Enquiries: Ph. 13 74 68

## Appendix A - Comments on the draft environmental management plan (EM plan) for the Washpool Coal Mine Project

### Waste management

#### Issue: Sewage effluent

The draft EM plan and EA conditions inconsistently describes how sewage effluent will be managed at the project site. The draft EM plan states that sewage waste will be contained on site and disposed of via evaporation dams and the EA condition G12 states that liquid waste will disposed by irrigation to land on site.

#### Recommendation:

Remove the inconsistency in the draft EM plan and EA conditions on how sewage effluent will be disposed at the project site.

#### Issue: Waste management – storage of tyres

Clarification is needed of what is meant by “must be stored in stable stacks” in condition G1.

#### Recommendation:

Condition G1 should describe how the stacks of tyres will be stored to ensure stability including dimensions and distances from other infrastructure. For example, tyres should be stockpiled in volumes less than 3 metres high and 200 metres square in area and at least 10 metres from any other storages.

### Surface water

#### Issue: Water storage facilities

Figure 19-5, *Proposed water quality monitoring locations and discharge points* does not provide adequate information on all the proposed water storage facilities for the project including all the discharge points, the location of the train load out dam and raw water dam, and pumping connections between dams.

#### Recommendation:

Amend figure 19-5, *Proposed water quality monitoring locations and discharge points*, to show:

- discharge points and spillways of all water storages
- train load out dam and raw water dam
- pipes used to pump water between water storage dams

#### Issue: Inconsistent surface water terminology

Water storages are not consistently described throughout the draft EM plan and proposed conditions. For example "tailing load-out dam" has been used interchangeably with "train load out dam" and "main retention dam" has been used interchangeably with "environmental dam".

#### Recommendation:

Ensure consistent terminology is used throughout the draft EM plan and proposed conditions.

### Groundwater

#### Issue: Impacts from mine dewatering

The EIS Addendums (January and February 2012) stated that any losses from the Mackenzie River as a result of mining will be offset by current and future water allocations to be purchased as part of the land purchase. However, the proponent has provided no information on discussions with SunWater regarding the take of water from the river.

#### Recommendation:

Include information on discussions with Sunwater regarding mitigating the potential take of water from the Mackenzie river from mining operations.

**Issue: Revised groundwater monitoring program**

Conditions C41 and C42 include a requirement to monitor groundwater and undertake mitigation. The bores to be monitored are included in Table 12 (*Groundwater monitoring locations*), which only lists three bores, two located in the coal measures and one in the alluvium. This is not a sufficient number of bores to adequately assess the impacts of mining on groundwater, especially for assessing the risk of water entering the pit from the river. Also, it is important that private bores be identified for the groundwater monitoring program.

Table 13 (*Groundwater investigation trigger levels*) should provided insufficient details in the specification of parameters, frequency, units, trigger levels and limits.

Also, the draft EM plan lacks an explanation of how the proposed design would achieve the goals of the groundwater monitoring program.

**Recommendations:**

Revise the groundwater monitoring program to include a sufficient number of bores and surface water monitoring points to adequately assess the impacts of mining. In Table 12, include the following additional monitoring bores:

- at least three monitoring bores in each aquifer at the project site
- private bores near the project site
- additional bores in the shallow alluvial between the pit and river for assessing the risk of water from the river entering the pit.

Also, provide a map showing the location of all proposed monitoring bores.

Amend Table 13 to provide details on the proposed groundwater monitoring parameters, frequency, etc., and include the monitoring of groundwater levels in the aquifers.

Provide an explanation in the EIS of how the design of the proposed groundwater monitoring program would achieve its goals.

## Appendix B - Comments on the Receiving Environment Monitoring Program (REMP)

1. The REMP should include procedures for assessing any exceedances of the water quality objectives (WQOs) or trigger values, in accordance with the Australian Water Quality Guidelines for Fresh and Marine Waters (ANZECC and ARMCANZ, 2000) and the Queensland Water Quality Guidelines (DERM, 2009).
2. The REMP incorrectly included mine affected water storages as monitoring sites such as coal pit storage and the main retention dam. Reference to mine affected water storages should be removed from the REMP and included as monitoring sites in the mine water management plan.
3. The REMP has been inconsistently referred to as “a routine environmental monitoring program” or as a “surface water monitoring program”. These should be replaced with 'Receiving Environment Monitoring Program'.
4. The monitoring sites included in the REMP should reflect receiving water upstream for background/reference sites and downstream monitoring sites as required in the conditions of the Final Model Water Conditions for Coal Mine in the Fitzroy Basin.
5. The following deficiencies are present in Table 5-2, *Mackenzie River - Environmental Values*, Table 5-3, *Burngrove Creek - Environmental Values* and Table 5-4, *Coal Mine Lagoon - Environmental Values*:
  - the inappropriate application of a condition assessment approach for assessing environmental values that is intended only for the environmental value of aquatic ecosystems under the Queensland Water Quality Guidelines (DERM, 2009)
  - insufficient data to conclude that the condition of aquatic ecosystems is “highly disturbed”. The condition of aquatic ecosystems should be described as “moderately disturbed”, which reflects the management intent or level of protection for this waterway outlined in the Mackenzie River Sub-basin Environmental Values and Water Quality Objectives (September 2011) under Schedule 1 of the Environmental Protection Policy (Water) 2009
  - environmental values in addition to aquatic ecosystems should be identified for protection
  - the comment “not used for drinking water” should be modified to incorporate the contextual information that these water bodies can contribute to the Mackenzie River when in flow upstream of the Bedford Weir (a potable water supply)
  - the comment “no cultural heritage or spiritual values known” should be clarified to show that the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register and/or the Queensland Heritage Register have been consulted
6. In Table 5-6, *Water quality objectives*:
  - Water Quality Objectives, the Mackenzie River Sub-basin Environmental Values and Water Quality Objectives (DERM, 2011) should be used as the source for locally derived and validated WQOs for each indicator
  - the following parameters should be adjusted as indicated in Table A1 below:

**Table A1**

Indicator	Adjustment required
pH	6.8-8.5
EC	<310 S/cm (WQO for the Mackenzie River)
Turbidity	<50 NTU
Dissolved Oxygen	85-110%
Ammonia N	<20 g/L
Total Suspended Solids	<110 mg/L
Sulphate	<10 mg/L in the “Ecosystem” column (Mackenzie River Sub-Basin WQO) and 250 mg/L in the raw water supply column (Australian Drinking Water Guidelines 2011). If by raw water supply

	drinking water is intended then the ADWG (2011) should be consulted and provided as a separate assessment column to the environmental value of “recreation”.
Sodium	20 mg/L and 180 mg/L in the ADWG (2011)
Chromium	50 g/L in the Recreational use column (ANZECC 2000)

- the comment “no commercial aquaculture practices are carried out” should be clarified as this is an environmental value identified for the Mackenzie River main channel in table 1 of the Mackenzie River Sub-basin Environmental Values and Water Quality Objectives (September 2011).
- 7. Information should be provided on the laboratory methods used for water sampling activities. If possible, make reference to the Australian Standard (AS) code or American Public Health Association (APHA)
- 8. The proponent should consider annual reporting for the REMP program with specific dates provided over the next two years. Also, the proponent should consider providing raw data in appendices or made available to EHP electronically in a suitable format (such as Microsoft Excel or Comma Separated Value<sup>10</sup>).
- 9. Figure 7-1, *REMP monitoring locations*, is very small and should be enlarged at least to A4 size and made legible.
- 10. The figure name and number is missing on page 32, 2nd paragraph.
- 11. All abbreviations used in the tables should be defined in the footnotes. Also, the water quality objectives should be referenced to the source documents in the footnotes.
- 12. All tables with spatial coordinates, northings and eastings should be converted to latitude and longitude (decimal degrees GDA94) to five decimal places.
- 13. Amendments should be made to Table B2 and Table B4 as recommended below:
  - In Table B2, *Concentrations of Metals, Alkalinity, Sulphate (SO<sub>4</sub>) Total Dissolve Solids (TDS) and comparison with Guideline Values – 2010/2011*:
    - when two WQOs are provided for a specific indicator, the basis for each of these should be clearly indicated. For example, sodium has two values provided for “potable supply”. The table should indicate that the first WQO is based on “at-risk medical” considerations while the second WQO is a taste threshold (aesthetic)
    - the sodium triggers for the environmental values “irrigation” under ANZECC and ARMCANZ of 460 mg/L for tolerant crops and 115 mg/L for sensitive crops should be included
    - the WQO of 5000 mg/L for TDS “potable supply” is incorrect (i.e. 500 mg/L aesthetic in the 2004 edition and multiple ranges from 0-600 mg/L “good” to >1200 mg/L “unacceptable” indicated in the 2011 edition of the Australian Drinking Water Guidelines). It should be noted that the indicator of TDS is not required with EC used as a surrogate
    - for all WQOs of the environmental values “drinking water”, the proponent should refer to table 4 of the Mackenzie River Sub-basin Environmental Water Quality Objectives in the first instance and subsequently to the latest edition of the Australian Drinking Water Guidelines (2011)
    - long term trigger values (LTV) and short term trigger values (STV) for metals in irrigation water are currently in the wrong order. For example, copper, the LTV should be 0.2 and the STV should be 5 mg/L, not visa versa as currently indicated. Any trigger value for metals should be applied only to the dissolved (unfiltered) concentrations
    - the trigger value (low risk) for copper of 0.4 is for “sheep” according to table 11 of the Mackenzie River Sub-basin Environmental Water Quality Objectives. The proponent should consider whether a trigger value (low risk) of 1 mg/L for cattle is more appropriate, given that cattle grazing is the most prominent form of grazing in the surrounding area.
  - In Table B4, *Physical and Chemical Water Quality Measurements and Concentrations and comparison with Guideline Values – 2010/2011*:

<sup>10</sup> Comma Separated Value is a common file type which can be imported into spreadsheet applications such as MS-Excel, database applications such as MS-Access, and contact databases such as MS-Outlook, ACT, Goldmine, etc This file type stores data in a spreadsheet type file where each cell in the file contains one piece of data such as first name, last name, address, etc



- amend the pH measurements for Burngrove Creek sample points 'BGC1' and '01' that states 78.8 and 82.2
- the only water quality objectives provided are for the environmental value of aquatic ecosystems from table 2 of the Mackenzie River Sub-basin Environmental Water Quality Objectives. Other environmental values such as stock, drinking water, recreation and irrigation should be considered
- the triggers for electrical conductivity and sulphate will eventually be based on flow criteria as defined in the Final Model Water Conditions for Coal Mines in the Fitzroy Basin. The proponent should develop the capacity to define and measure flow in receiving water with respect to these indicators rather than indicate Flow – “Yes/No”.

## Appendix C - Comments on the proposed environmental authority (EA) conditions: Schedule C – Water

It is recommended that the proponent seek advice from EHP, Aquatic Ecosystem Risk and Decision Support (AERDS) unit with respect to implementation of the Final Model Water Conditions for Coal Mines in the Fitzroy Basin. AERDS makes the following recommendations:

1. Latitude and longitude should be provided in decimal degrees (GDA94) to 5 decimal places throughout the proposed conditions.
2. In Table 1:
  - change the table heading “Contaminant release points, sources and receiving waters” to “Mine Affected Water Release Points, Sources and Receiving Waters” in accordance with the Final Model Conditions for Coal Mines in the Fitzroy Basin (FMWC)
  - change “Environmental Dam” to “Main Retention Dam” so that it is consistent with the EIS
  - include the release points for all mine affected waters including release points from the northern sediment dams.
3. In Table 2:
  - change the heading “Contaminant release limits” to “Mine Affected Water Release Limits” as in the FMWC
  - modify formatting to the same column format headings as contained within the FMWC.
  - comments relating to each Quality Characteristic are outlined in Table C1 below.

**Table C1**

Quality Characteristic	Comments
Electrical conductivity (µS/cm)	Should not contain a specific release limit rather – “Release limits specified in table 4 for variable flow criteria”
Turbidity (NTU)	Current limit or limit derived from suspended solids limit and demonstrate correlation between turbidity to suspended solids historical monitoring data from dam water *.
Suspended solids (mg/L)	The proponent needs to make a case for the proposed limit of 150 mg/L. The limit should be based on both receiving water reference data and achievable best practice sediment control and treatment.
Sulphate (mg/L)	The release limit here should be either 250 mg/L or should state – “Release limits specified in table 4 for variable flow criteria

Note: \*Limit for suspended solids can be omitted if turbidity limit is included. Limit for turbidity not required if suspended solids limit included. Both indicators should be measured in all cases.

4. In table 3:
  - the title heading should include the following underlined words: “(Release Contaminant Trigger Investigation Levels) Potential Contaminants”
  - the trigger level for aluminium should be corrected to “55µg/L”
  - include a sodium trigger level of 180 mg/L.
5. Condition W6, in the Note: W5(2)b(ii) of this condition needs to be changed to W6 2(b).
6. Condition W7, should refer to condition W6 2 (b), not to C6(2)b(ii).
7. Conditions W8, W9, W10 and throughout should refer to Table 4 by its correct title, *Mine Affected Release during Flow Events*.
8. Table 4, *Mine Affected Release during Flow Events*, requires significant revision and the proponent should contact EHP, Aquatic Ecosystem Risk and Decision Support (AERDS) regarding this table. Preliminary comments are outlined below:

- The co-ordinates provided for the gauging station in Burngrove Creek are the same as the co-ordinates for the release point. This gauging station should be located upstream of the release point at a minimum distance to ensure that flow does not diminish by the time it reaches the release point and that it is not significantly affected by other upstream point source releases. The proponent should propose and justify the location of any gauging station used to calculate flow triggers as distinct from the release point. Any additional release points may require their own gauging station (i.e. if discharge into the Mackenzie River occurs from the Northern Sediment Dam).
  - Receiving water flow criteria are outlined in Table 4, which includes 1 low flow criteria, six medium flow criteria and four high flow criteria. The proponent should propose one low, two medium and one high flow criteria. More high flow criteria may be considered on a case-by-case basis. The proponent has currently provided no basis for the event flow trigger of 3.5 m<sup>3</sup>/s. This figure should be determined based on sufficient EC versus flow data or where insufficient data exists based on appropriate hydrological calculations. In this case, AERDS have assumed that the gauging station is in fact located at Site A (the upstream monitoring site in Burngrove Creek), determined a catchment area of 459 km<sup>2</sup> and estimated an event trigger of between 1 m<sup>3</sup>/s and 2.75 m<sup>3</sup>/s which is lower than the event trigger currently indicated of 3.5 m<sup>3</sup>/s. Further comments will be provided by AERDS on either receiving water flow criteria or maximum release rates when this table is revised.
  - The current text included within the low flow receiving water flow criteria of “any m<sup>3</sup>/s whilst still adhering to W13” is unacceptable and should be deleted.
  - Electrical conductivity and sulfate release limits are outlined in Table 4. These should be revisited as a result of recommended revisions to receiving water flow criteria.
  - The water quality objective for electrical conductivity under base flow conditions is 310 µS/cm in the Mackenzie River Sub-basin Environmental Values and Water Quality Objectives (2011). The EC Release Limit of 700 µS/cm should be replaced with this WQO within the Low Flow Criteria.
  - The proponent should consider the location of the Washpool Mine within Zone 2 in accordance with the FMWC in order to derive medium flow criteria.
9. Condition W12 should end at “table 1” and the following underlined text deleted: “Contaminant release flow rate must not exceed twenty percent (20 %) of receiving flow rate”.
10. In Table 5, *Water Storage Monitoring*:
- Change “Environmental Dam” to “Main Retention Dam” to make consistent with the EIS.
  - The proponent should justify why a single monitoring location is sufficient to deal with any stratification within this water storage, otherwise additional monitoring locations should be proposed
  - Include all mine affected water storages including sediment dams and pit water.
11. In Condition C20:
- C20 should be changed to W20
  - Appendix 2 should be changed to Appendix Q.
12. In Table 7, *Receiving Waters Contaminant Trigger Levels*:
- the proponent should make a case for the EC trigger of 1000 µS/cm or preferably propose a lower trigger (where in close proximity upstream of a drinking water dam or regional waterway)
  - a sodium trigger level of 180 mg/L should also be included.
13. In Table 8, *Receiving Water Upstream Background Sites and Down Stream Monitoring Points*:
- the receiving waters location descriptions for all upstream and downstream monitoring points should include the distances up and downstream of each release point as outlined in the FMWC.
  - in the Notes (b), it states that the downstream point should not be greater than 1.6 km from the release point. This should be revised to 20 km in accordance with the location of Monitoring Point F in the Mackenzie River. This distance is more appropriate since the Mackenzie River wraps around the mine site and Monitoring Point F is located just after the end of the mine area which is appropriate and will incorporate any influence of discharge from the northern sediment dam or run-off.

14. Condition W21 duplicates C19 are . C19 and its accompanying text should be deleted.
15. In Condition W22, the proponent should change 5 km to 20 km so the following sentence reads as follows:  
“For the purpose of the REMP, the receiving environment is the waters of the Mackenzie River and connected or surrounding waterways within 20 km downstream of the release of mine affected water.”
16. In Table 10, *Irrigation Water Release Limits*, a water release limit for EC should be proposed. The proponent should consult the ANZECC and ARMCANZ (2000) guidelines for its derivations.