



Isaac Plains Coal Management Pty Ltd
(as Manager for and on behalf of the participants
in the Isaac Plains Coal Joint Venture)

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1 May 2009

Department of Environment and Resource Management
99 Hospital Road
EMERALD QLD 4720

Attention: Mr Glen Wright

Dear Glen

Integrated Isaac Plains Project

This letter responds to the EPA's proposed Environmental Authority (EA) conditions and requests for amendments to the Environmental Management Plan (EM Plan) included in the EIS Assessment Report for the Integrated Isaac Plains Project (IIPP), dated March 2009.

Amended Environmental Authority

A draft Environmental Authority for the IIPP is attached to this letter. The EA is the current Isaac Plains Mine EA amended to include the additional conditions proposed by the EPA in the EIS Assessment Report. IPCM's requested changes to the draft amended EA are highlighted in the document in tracked-edit. IPCM has particular concerns with the following proposed conditions:

End of Pipe Contaminant Release Limits (Schedule C – Table 2)

The proposed end of pipe EC limit of 1,400 uS/cm will mean that we will be unable to discharge undiluted pit water from the site. This would mean that our mining operations will potentially be shut down following any prolonged rainfall periods. During such periods we will potentially accumulate pit water in volumes that exceed our site water storage capacity. Pit water salinity is typically significantly higher than 1,400 uS/cm and without the ability to discharge this water our operations will have to cease. Our current EA site water discharge conditions include only receiving water EC limits which already ensure the protection of the downstream environment. The control of saline site water discharges via dilution within a mixing zone and compliance with receiving water limits is consistent with operating best practice saline water discharge control systems such the Hunter River Salinity Trading Scheme. The proposed additional end of pipe limits are unworkable and unnecessary and we therefore request they are deleted.

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End of Pipe Contaminant Trigger Values (Schedule C – Table 3), Receiving Water Contaminant Trigger Levels (Schedule C – Table 9)

We do not currently have sufficient water quality data to evaluate the appropriateness of these new water quality trigger values. We therefore request that we are provided sufficient time to gather water quality monitoring data in order to evaluate the reasonableness of any trigger values.

Condition C1-6

The requirement to limit the proportion of the receiving water flow that is discharge water, in addition to receiving water quality limits, is superfluous. This requirement effectively adds no additional control in relation protection against any potential downstream environmental harm and we request it is deleted.

Condition C2-1

Conditions (h) and (i) are requesting the submission of water quality information prior to the time that it is required to be monitored. We request these conditions are deleted.

Condition C3-3

The requirement to monitor Chlorophyll A in receiving water is not justified in the context of mine water discharges and should be deleted.

Condition C6-1 Water Sediment Controls

The requirements of this condition duplicate the requirements of Condition C7-1 which requires the development and implementation of a plan that addresses site storm water and erosion control. We request it is deleted.

Stream Sediment Contamination Levels – Conditions C8-1 to C8-5

There is currently no justification for downstream stream sediment sampling and the required water quality monitoring would identify any unanticipated potential sediment contaminants, should they arise in the future. We request these conditions are deleted.

Groundwater Investigation Trigger Levels (Schedule C – Table 14)

We do not currently have sufficient water quality data to nominate trigger values for the parameters listed. We therefore request that we are provided sufficient time to gather water quality monitoring data in order to populate the table.

C10-2

The approved EIS predicts groundwater drawdowns greater than 2 m. The trigger for an investigation should relate to the EIS drawdown predictions.

Shut Down Procedure & Real Time Monitoring - Conditions G2-5 & G2-6

The conditions related to a shut down procedure and real time monitoring should reasonably only apply to parameters for which there is potential exceedance of the relevant criteria identified in the approved EIS.

On this basis, the requirement for real time monitoring and a shut down procedure relates to dust impacts (PM₁₀) rather than noise. The noise assessment in the approved EIS does not identify any potential exceedances of the noise criteria in Moranbah. The only potential significant noise exceedance identified is at the Winchester Downs homestead. IPCM is required to reach agreement with the owner of this property in relation to the project, prior to the grant of the mining lease. This agreement will address the potential noise impacts of the mine on the homestead.

We therefore request that the proposed conditions related to the shut down procedure and real time monitoring are included in Schedule B – Air and are applicable to PM₁₀ only.

EIS Assessment Report

Our response to various issues raised in Sections 4 and 5 of the EIS Assessment Report area as follows:

Section 4.2 - The proponent has also committed to conducting field verification of dust emissions from the dragline bucket during mining operations for comparison with the modeled results and EA limits.

This requirement relates to the refinement of an input to the EIS dust model and is now redundant given the requirement for real time dust monitoring of actual dust emissions from the approved mining operations.

Section 5, EM Plan Section 20.5.3 – Shut down procedure.

The EM Plan has been amended to provide details of the proposed shut down procedure.

Section 5, EM Plan Section 20.9.3 – Unless the rock protection and filters were used on both the inside and outside faces of the proposed levee over its full length, a crest width of 5 m would not normally be sufficient to withstand the erosive forces and maintain structural integrity for 150 years.

EA condition H3-2 requires the preparation of a design plan for the levees and certification of the plan by a suitably qualified and experienced person that the design will be compliant in all respects with the EA. Condition H1-1 also requires that the levees are designed *in accordance with accepted engineering standards* and are *fit for the purpose for which they are intended*.

Compliance with these EA conditions will ensure that an appropriate levee design and crest width will be adopted.

Section 5, EM Plan Section 20.9.3 – The proponent should reconsider the current post-mining landform design and submit in an amended EM Plan an alternative design which addresses the issues raised above.

The amended EM Plan includes updated conceptual final landform plans (Figures 20-16 to 20-21) that include the following changes to address issues raised by the EPA in Section 5 of the EIS Assessment Report:

- The PMF levee has been integrated with the toe of the external overburden dump slopes and the perimeter toe drain and levee culverts/flood gates have been deleted.
- Conceptual indicative locations and typical sections of overburden slope contour drains have been provided.
- Conceptual indicative locations of lined drainage points across the levee have been shown at the points where the contour drains meet the levee.
- The level of the overburden on the Isaac River side of the pit has been raised to buttress the levee.

Amended Environmental Management Plan

An amended EM Plan is attached. It includes amendments to address the requirements specified in Sections 4 and 5 of the EIS Assessment Report, with the modifications discussed above. It also includes the latest version of the draft EA conditions. The changes to the EM Plan compared to the version in the Amalgamated EIS, are highlighted in tracked-edit.

Should you have any queries in relation to this letter, please do not hesitate to call Hayden Leary on (07) 3020 4203.

Yours sincerely

Hayden Leary
Manager Health, Safety, Environment and Community Affairs
Isaac Plains Coal Management

Attachments:

1. ***Draft Integrated Isaac Plains Project Environmental Authority*** – this is the current Isaac Plains Environmental Authority with the additional Environmental Authority conditions proposed by the EPA in the EIS Assessment Report included. IPCM's requested amendments to the EPA's proposed additional conditions are highlighted in tracked-edit.
2. ***Revised Integrated Isaac Plains Project Environmental Management Plan*** – this is the version of the EM Plan included in the Amalgamated EIS, amended to include changes in response to the EIS Assessment Report. Proposed changes are highlighted in tracked-edit.

RTI DL RELEASED



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20 ENVIRONMENTAL MANAGEMENT PLAN

This Environmental Management Plan has been developed as a 'stand alone' section in accordance with the requirements of the ToR for the IIPP EIS. There is therefore some repetition of information provided in earlier sections of the EIS.

20.1 INTRODUCTION

This Environmental Management Plan (EM Plan) has been prepared by Isaac Plains Coal Management Pty Ltd (IPCM), operator of the existing Isaac Plains Coal Mine, for the Integrated Isaac Plains Project (IIPP), i.e. covering the existing Isaac Plains Coal Mine and the proposed Expansion Area.

The EM Plan has been prepared in accordance with the Environmental Protection Agency's (EPA) Guideline 8 *Preparing an Environmental Management Overview Strategy (EMOS) for non-standard mining projects* and the EP Act. The purpose of this EM Plan is defined in Section 202 of the EP Act.

The primary role of the EM Plan is to propose environmental protection commitments to help the administering authority decide on the conditions of the EA. This EM Plan defines the environmental protection measures for the management of impacts associated with the IIPP and also proposes new conditions for the IIPP EA to supersede the conditions contained in the existing EA (Permit # MIN100329505; 21 December 2007). (NB: The EA was recently reissued following an administrative amendment made by the EPA).

20.2 PROJECT DESCRIPTION

20.2.1 Project Ownership

The IIPP will be operated as an unincorporated joint venture with IPCM being the management company responsible for all operations undertaken as part of the IIPP on behalf of the joint venture participants, i.e. IP Coal Pty Ltd (IP Coal) (50 %) and Vale Australia (IP) Pty Ltd (Vale) (50 %). For the sake of simplicity, the term IPCM is used throughout this document to refer to the joint venture participants and the Manager of the IIPP.

20.2.2 Integrated Isaac Plains Project – Project Overview

IPCM, on behalf of the joint venture participants, has applied for MLs under the *Mineral Resources Act 1989* (MRA) for an extension to the existing Isaac Plains Coal Mine onto the southern part of EPC755, onto an adjoining area to the west known as the Kumba Designated Area (KDA)¹, and for a access/haul road linking the Expansion Area to the existing Isaac Plains Coal Mine. These areas are collectively referred to as the "Expansion Area". The proposed project, referred to as the IIPP, will comprise some changes to the existing Isaac Plains Coal Mine located on Mining Lease (ML) 70342, and activities within the Expansion Area as further described below.

The major components of the IIPP, located either wholly or partially within the Expansion Area, in addition to those identified above, will include:

- open cut pit(s);
- out-of-pit spoil dumps;
- access and haul roads;
- ROM coal stockpile;
- a dragline (initially operating in the existing Isaac Plains Coal Mine);
- mine infrastructure area including office buildings, controlled access gate and septic system and transpiration trench;
- an underpass of the Peak Downs Highway;
- a low level crossing of the Isaac River;
- water management structures; and

¹ The KDA is an area of EPC 548 that adjoins the western boundary of EPC 755 over which Kumba Australia Pty Ltd has granted exclusive rights to IPCM, for a period of 4 years, to prospect, explore and investigate the Rangal Coal Measures and to apply for additional mining tenements required to mine any resource identified within it.



- installation of flood levees as part of the pre-strip operation, at the commencement of mining.

In addition, a heavy equipment construction pad will be built at the existing Isaac Plains Coal Mine. The pad will be used initially for assembly of the dragline and then periodically over the life of the mine as needed for refurbishment work that needs to take place on the larger items of mining equipment. It is proposed that the dragline will commence operating in the existing Isaac Plains Coal Mine and on completion of mining in this area, will be walked to the Expansion Area, from the existing Isaac Plains Coal Mine, in approximately 2016.

The IIPP also includes diverting two waterways, namely Smoky Creek within the existing Isaac Plains Coal Mine site, and Conrock Gully, within the Expansion Area. The approval of the diversions within ML70342, ML Application (MLa) 70361, MLa70380, MLa70381 and EPC755 form part of the EIS.

Note: Conrock Gully is the name adopted for the formerly unnamed waterway which traverses the Expansion Area, and is consistent with that used by the landholders. The Department of Natural Resources and Water (DNRW) has determined that Conrock Gully is not classified as a watercourse under the provisions of the *Water Act 2000*.

As part of the IIPP approval process, IPCM will apply to amend the approved EA for the existing Isaac Plains Coal Mine to form a single Project Authority combining ML70342 and the MLAs for the Expansion Area, under the *Environmental Protection Act 1994* (EP Act). Therefore, this EM Plan covers the IIPP as a whole.

The existing Isaac Plains Coal Mine on ML70342, as originally planned, was referred and assessed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) (referral submitted on 5 April 2005) by the Commonwealth Department of the Environment and Heritage DEH². It was decided on the 6 May 2005, by the delegate of the then Federal Minister for the Environment and Heritage that the existing Isaac Plains Coal Mine would not be a controlled action.

In the period since that referral, IPCM identified sufficient coal reserves in the Expansion Area that they subsequently deem feasible to proceed with the development of the Expansion Area. The coal reserves under Smoky Creek were also deemed of sufficient economic value to feasibly divert Smoky Creek to mine the underlying coal.

An EPBC Act referral for the IIPP was submitted for assessment by the DEH on 8 September 2006. On the 6 October 2006 it was decided by the delegate of the Federal Minister for the Environment and Heritage that the IIPP would not be a controlled action.

20.2.3 Project Location, Tenure and Tenements

The existing approved Isaac Plains Coal Mine is located in ML 70342 approximately 7 km north-west of the township of Moranbah, in the Moranbah region of the central western Queensland coalfields (refer to **Figure 20-1** and **Figure 20-2**). The Expansion Area is located on EPC755 on the Winchester Downs property, south of the Peak Downs Highway, approximately 10-12 km from Moranbah (refer to **Figure 20-3**). A significant portion of the proposed Expansion Area is located in the KDA.

The proposed access/haul road required to link the Expansion Area to the existing Isaac Plains Coal Mine will traverse EPC755, EPC602 and EPC548. Vale and IP Coal hold EPC755 while Anglo Coal (Grosvenor) Pty Ltd (Anglo Coal) and Exxaro Australia Pty Ltd (Exxaro) are the principal holders of EPC602 and EPC548 respectively. Anglo Coal Australia is conducting exploration works in EPC602 and EPC548 to ascertain the suitability of a potential underground coal mine. Accordingly, IPCM is negotiating an agreement with Anglo Coal and Exxaro to obtain consent for mine infrastructure to be established on those tenements not held by the Applicants.

² The DEH is now known as the Department of the Environment, Water, Heritage and the Arts.



CH4 Pty Ltd (CH4), a subsidiary of Arrow Energy Ltd (Arrow Energy), holds Petroleum Lease application (PLa) 222 over part of the KDA, Petroleum Lease (PL) 196 over the existing Isaac Plains Coal Mine and PL191 over a section of the proposed access/haul road in the vicinity of the Peak Downs Highway. An Authority to Prospect (EPP) 364 (held by AGL Energy Ltd (99%) and CH4 (1%)) covers the remainder of the Expansion Area. The occurrence of petroleum tenements over the proposed MLs has relevance to the ML application process under the MRA whereby the Applicants are required to consult with the petroleum tenement holders, and need their consent for the grant of the MLs where they are overlapped by PLs. Existing agreements between the parties give CH4 priority to coal seam gas where the PLs overlap the proposed ML area, but Arrow Energy has determined that no appreciable methane reserves are present and it currently has no plans for the commercial capture of gas in the area.

The Expansion Area is located within the Nebo Shire Council Local Government Area (LGA), while the existing Isaac Plains Coal Mine, on ML70342, is located within the Belyando Shire Council LGA.³

The existing Isaac Plains Coal Mine is located on Lot 3 GV252 (Freehold – Rural A), Lot 2 RP90445 (Freehold – Rural A), Lot 4 CP903281 (Lands Lease – Rural) and an unnamed road. Smoky Creek and Billy's Gully are both located on Lot 3 GV252.

The Expansion Area traverses Lot 5 GV132 (Freehold – Rural Agricultural Protection), Lot 6 SP174999 (Freehold – Rural Agricultural Protection), Lot 9 GV33 (Reserve – Special Purpose Zoning for camping, water and roads) and Lot 8 GV196 (zoned as a Reserve – Special Purpose Zoning, however, it is strategically designated as Rural Agricultural Protection). The principal landholdings are Lot 5 and Lot 6.

Figure 20-4 and **Figure 20-5** illustrate the tenure of the IIPP and surrounding area and **Figure 20-6** and **Figure 20-7** illustrate the tenements over the IIPP.

The Expansion Area is south of the Isaac River and is currently accessed via Winchester Road. As part of the IIPP, an access/haul road is proposed to be constructed which will act as the primary access servicing the Expansion Area. The access/haul road will include a low level crossing of the Isaac River and the construction of an underpass beneath the Peak Downs Highway.

The southern boundary of the Expansion Area is bordered by Cherwell Creek, a tributary of the Isaac River. Neither Cherwell Creek nor the Isaac River requires diversion. An unnamed watercourse known locally as Conrock Gully, also a tributary of the Isaac River, passes through the middle of the Expansion Area in a general west-east direction.

The IIPP includes the diversion of two waterways, namely Smoky Creek within the existing Isaac Plains Coal Mine site and Conrock Gully within the Expansion Area. The Smoky Creek diversion within ML70342 is not a currently approved activity.

The nearest residences to the IIPP are as follows:

- sch4p3(3) Prejudice the protection of an individuals right to privacy less than 1 km south of the proposed Expansion Area boundary and approximately 1 km from the planned southern extent of the open cut development;
- sch4p3(3) Prejudice the protection of an individuals right to privacy of the proposed access/haul road crossing of the Peak Downs Highway, 2 km from the existing Isaac Plains Coal Mine and 7 km from the expansion area;
- sch4p3(3) Prejudice the protection of an individuals right to privacy of the Expansion Area and 3 km from the existing Isaac Plains Coal Mine;
- sch4p3(3) Prejudice the protection of an individuals right to privacy of the existing Isaac Plains Coal Mine and 13 km from the expansion area;
- the sch4p3(3) Prejudice the protection of an individuals right to privacy of the Expansion Area and 6 km from the expansion area, on the
- sch4p3(3) Prejudice the protection of an individuals right to privacy for the expansion area and 16 km from the Peak Downs Highway underpass.

³ NB: Since the release of the EIS for public comment, Belyando, Nebo and Broadsound Shires have been amalgamated. This revised EIS has not been amended to reflect this as the intention of this version of the EIS is to address comments from stakeholders at the time of public release, including both Belyando and Nebo Shire Councils.



Figure 20-2 and **Figure 20-3** illustrate the location of the nearest residences and the township of Moranbah with respect to the IIPP.

There are numerous mines within close proximity to the IIPP. Approximate distances to existing mines in the area surrounding the IIPP comprise:

- Peak Downs Mine, 8 km south-west of the existing mine and 5 km south of the Expansion Area;
- Carborough Downs Mine, 5 km east of the existing mine and 9 km north of the Expansion Area;
- Broadlea Mine, 4.5 km north-east of the existing mine and 17.5 km north of the Expansion Area;
- Poitrel Mine, 9 km south-east of the existing mine and 3 km east of the Expansion Area;
- Millennium Mine, 6 km south-east of the existing mine and 3 km north-east of the Expansion Area;
- Winchester Mine, 12 km south-east of the existing mine and 3.5 km east of the Expansion Area; and
- Moranbah North Mine, 7 km north-west of the existing mine and 20.5 km north-west of the Expansion Area.

Figure 20-8 illustrates the location of the aforementioned mines.

There are no areas designated as National Parks, State Forests or conservation zones within the IIPP area, or within the adjacent area.

20.2.4 Relevant Stakeholders

The list of affected and interested persons/parties was initially developed through research on the IIPP area and through discussions with EPA. This list is provided below.

20.2.4.1 Affected Persons/Parties

Property Owners

sch4p3(3) Prejudice the protection of an individuals right to privacy

Traditional Owners

- Barada Barna, Kabalbara and Yetimarla People (BBKY)

State Controlled Land - Peak Downs Highway

- Department of Main Roads
 - Rockhampton
 - Mackay
 - Brisbane

Others

- Kumba Australia Pty Ltd
- Arrow Energy NL Pty Ltd
- Anglo Coal (Grosvenor) Pty Ltd
- Exxaro Australia Pty Ltd
- BHP Mitsui Coal Pty Ltd

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20.2.4.2 Interested Persons/Parties

- Department of Natural Resources and Water
 - Mackay
 - Brisbane
- Department of Mines and Energy - Rockhampton
- Department of Local Government, Planning, Sport and Recreation
 - Mackay
 - Brisbane
- Department of Communities - Mackay
- Queensland Health - Mackay
- Queensland Transport - Townsville
- Agforce - Brisbane
- SunWater - Biloela
- Nebo-Broadsound Landcare Group - Mackay
- Capricorn Conservation Council - Rockhampton
- Nebo Shire Council - Nebo
- Belyando Shire Council - Moranbah
- Department of Housing - Brisbane
- The Coordinator-General - Brisbane
- Environmental Protection Agency - Emerald
- Department of Emergency Services - Brisbane
- Queensland Health
- Department of Primary Industries and Fisheries - Rockhampton
- Queensland Police Service, Central Police Region - Rockhampton
- CHRRUP - Emerald
- Fitzroy Basin Association - Rockhampton
- Sunfish (Queensland) - Mackay Regional Branch
- Clermont Fish Stocking Group Inc.
- Emerald Fish Stocking Group Inc.
- MacKenzie River Fish Stocking Association Inc.

From the outset, IPCM have recognised the importance of consultation with and involvement of local stakeholders to be an integral component of the planning and approvals process for the IIPP.

This process commenced with the identification and early engagement of stakeholders in order to identify broad issues of concern. Consultation with local community and interest groups will extend from the planning phase, through the IIPP operations to final rehabilitation. This process also included meetings with Council representatives, interest group meetings and other meetings designed to encourage and facilitate community involvement and/or education in relation to the IIPP and open cut coal mining as a whole.



The community consultation process also included a review process which:

- provided the broader community with opportunities to provide input; and
- ensures that the various management plans evolve over time to reflect changing community values and advances in scientific knowledge.

The community and stakeholder involvement process provided an opportunity for community issues and concerns to influence the nature of the IIPP. All feedback was recorded and, where appropriate, has been used to refine IPCM's management processes, monitoring and future rehabilitation efforts for the IIPP.

20.3 MINING ACTIVITIES

Based on the current resource estimates and mine planning, ROM coal production from the IIPP will increase from the currently approved rate of 1.9 Mtpa up to approximately 4 Mtpa ROM coal for a period of approximately 15 years. IPCM commenced development of the Isaac Plains Coal Mine in late 2005 and coal production commenced in the third quarter of 2006. Mined coal from the Expansion Area will be hauled north across the Isaac River over a new low level crossing, and through an underpass of the Peak Downs Highway, to the CHPP on ML70342 (refer to **Figure 20-2** and **Figure 20-3**). Processed and washed coal from the IIPP will be railed to Dalrymple Bay Coal Terminal and exported. The existing Isaac Plains Coal Mine CHPP has the capacity to accommodate the planned ROM coal production of raw 4 Mtpa, with the increased throughput from the IIPP being achieved through increased operational hours, i.e. the CHPP will not require an upgrade to process the increased volume of coal. NB: The CHPP was approved based on modelling for a 24 hr, 7 days per week operation.

20.3.1 Mining

The IIPP will be developed as an open cut coal mine involving the production of ROM coal from one or more active mining areas concurrently. The ROM coal will be transported to the CHPP at the Isaac Plains Coal Mine to be crushed, sized and washed, before being railed to Dalrymple Bay Terminal for export. Approximately 25% of the coal produced will be coking coal, 25% thermal coal and the remaining 50% of coal being PCI.

A combination of truck and shovel and dragline mining methods will be used to achieve the planned production of up to raw 4 Mtpa ROM coal.

The proposed mining operations will entail:

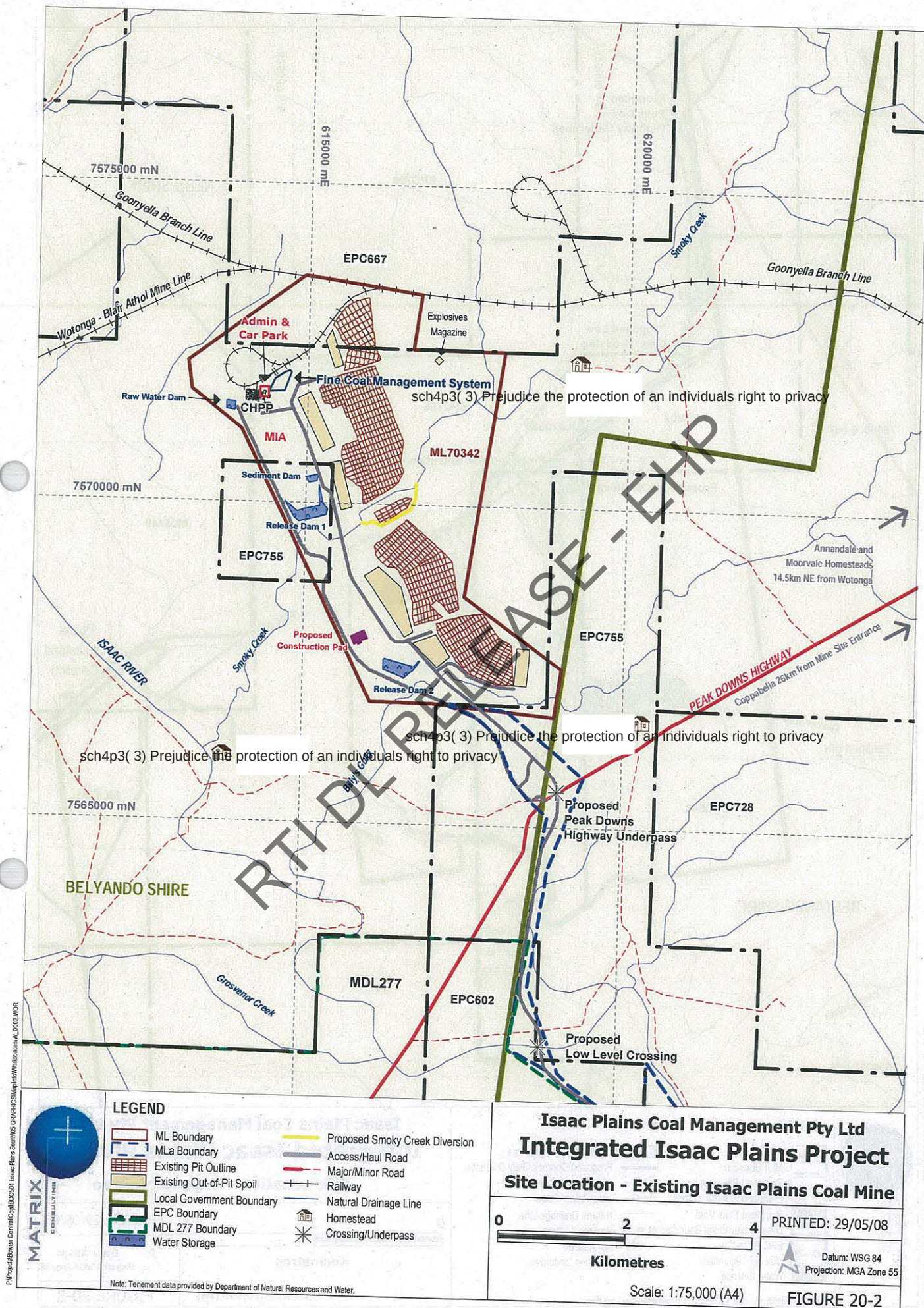
- progressive clearing of the vegetation occurring on those areas to be disturbed;
- salvage and stockpiling of topsoil from disturbed areas for future use in rehabilitation;
- blasting and removal of waste rock;
- removal of coal; and
- site rehabilitation.

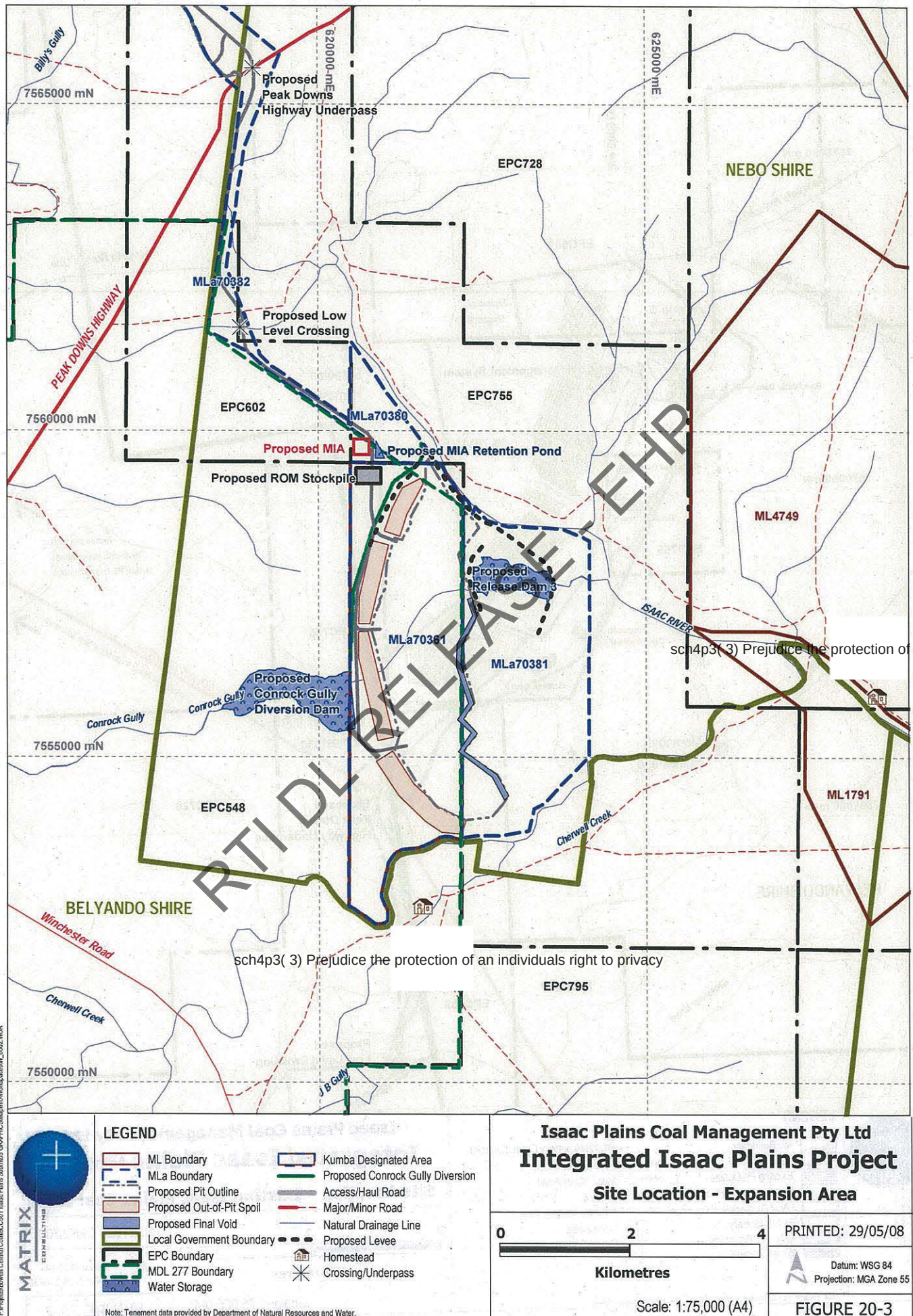
Mining within the Expansion Area will require the development of an initial box-cut and out of pit spoil dump in order to open up the pit. Subsequent removal of the overburden will be carried out by dragline and truck and shovel methods. Overburden material will initially be placed out-of-pit, with in-pit emplacement undertaken once an adequate area of mined-out pit, is available. To maintain safe operation of the Expansion Area pit and mine infrastructure area during mining operations, a levee will be constructed to prevent encroachment of floodwaters from the Isaac River (refer to **Figure 20-3**). The operational levee height will be up to ±0.5 m above the 1% AEP Q500 flood-height level.

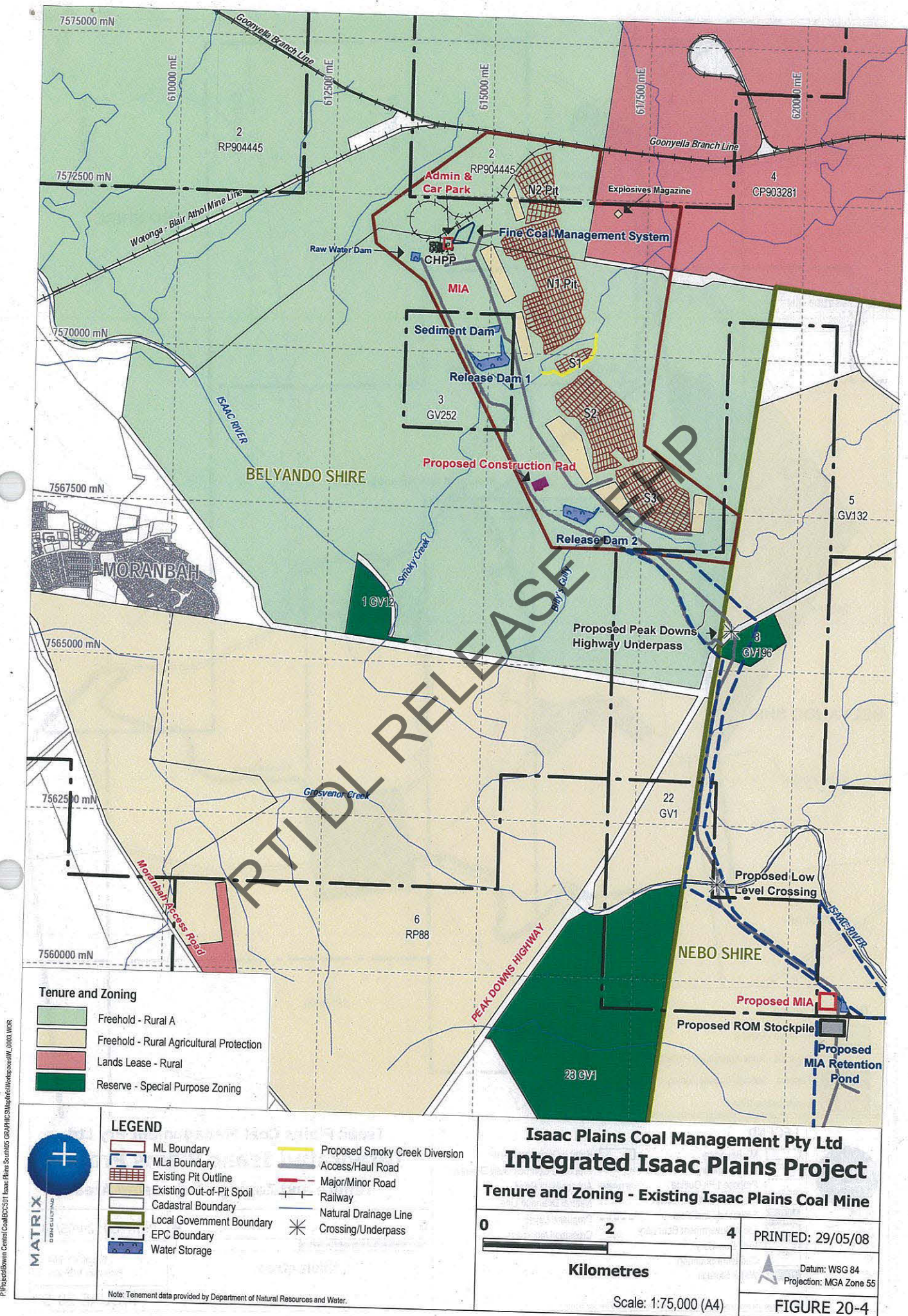
Once mining has been completed in the Expansion Area, the levee will be removed and the pit on the flood plain (defined as the 202 m AHD contour Probable Maximum Flood (PMF) level) will be filled in leaving only the rehabilitated spoil dump. Details and conceptual diagrams of the end of mine landform are provided in **Section 20.9.3**. The pit to the south of the 202 m contour PMF outside the floodplain will remain as a residual void.

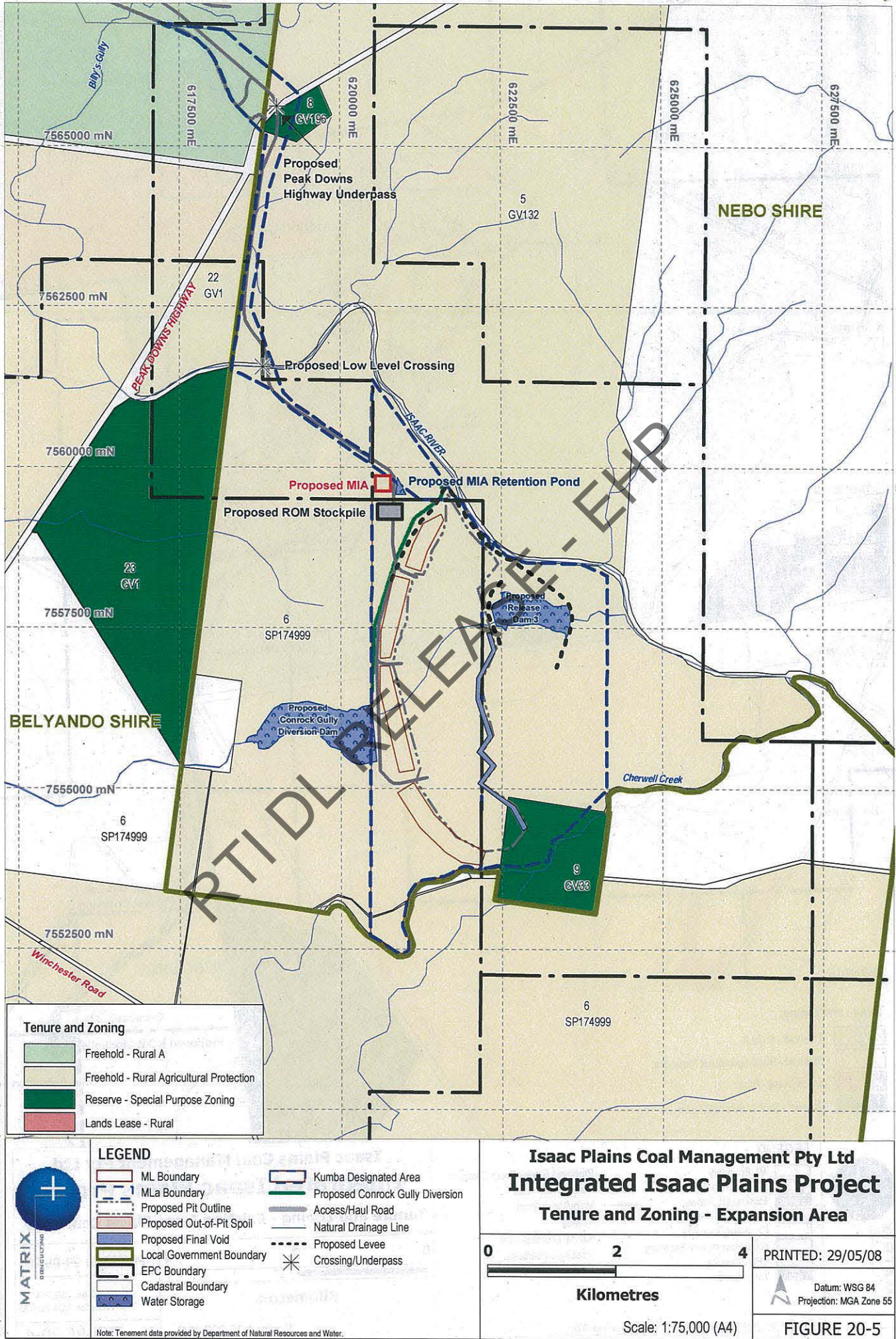
At the existing Isaac Plains Coal Mine a residual void will be left for the length of each pit after mining has been completed with the exception of the S1 pit next to the Smoky Creek diversion which will be filled in using lowall material.

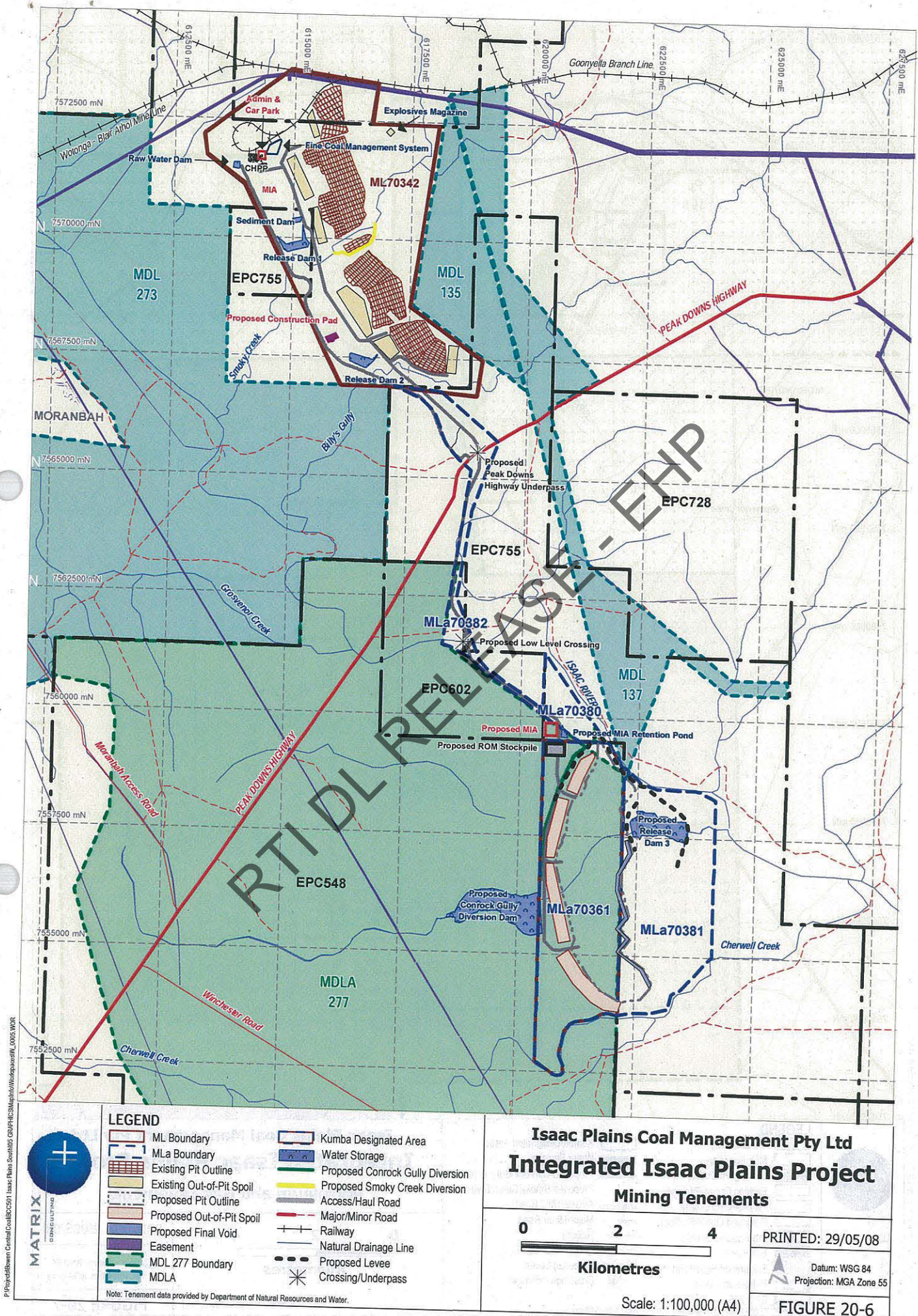


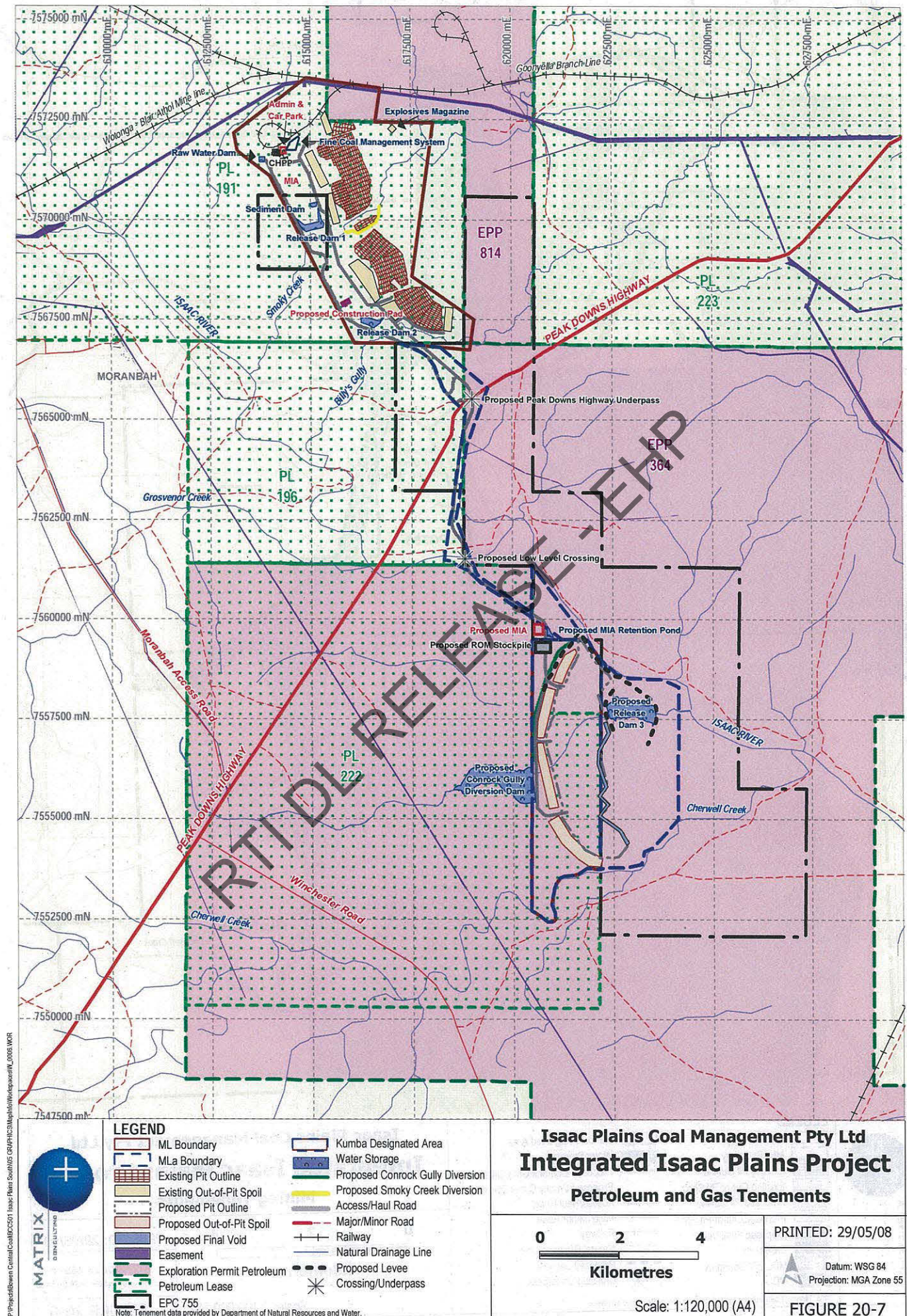


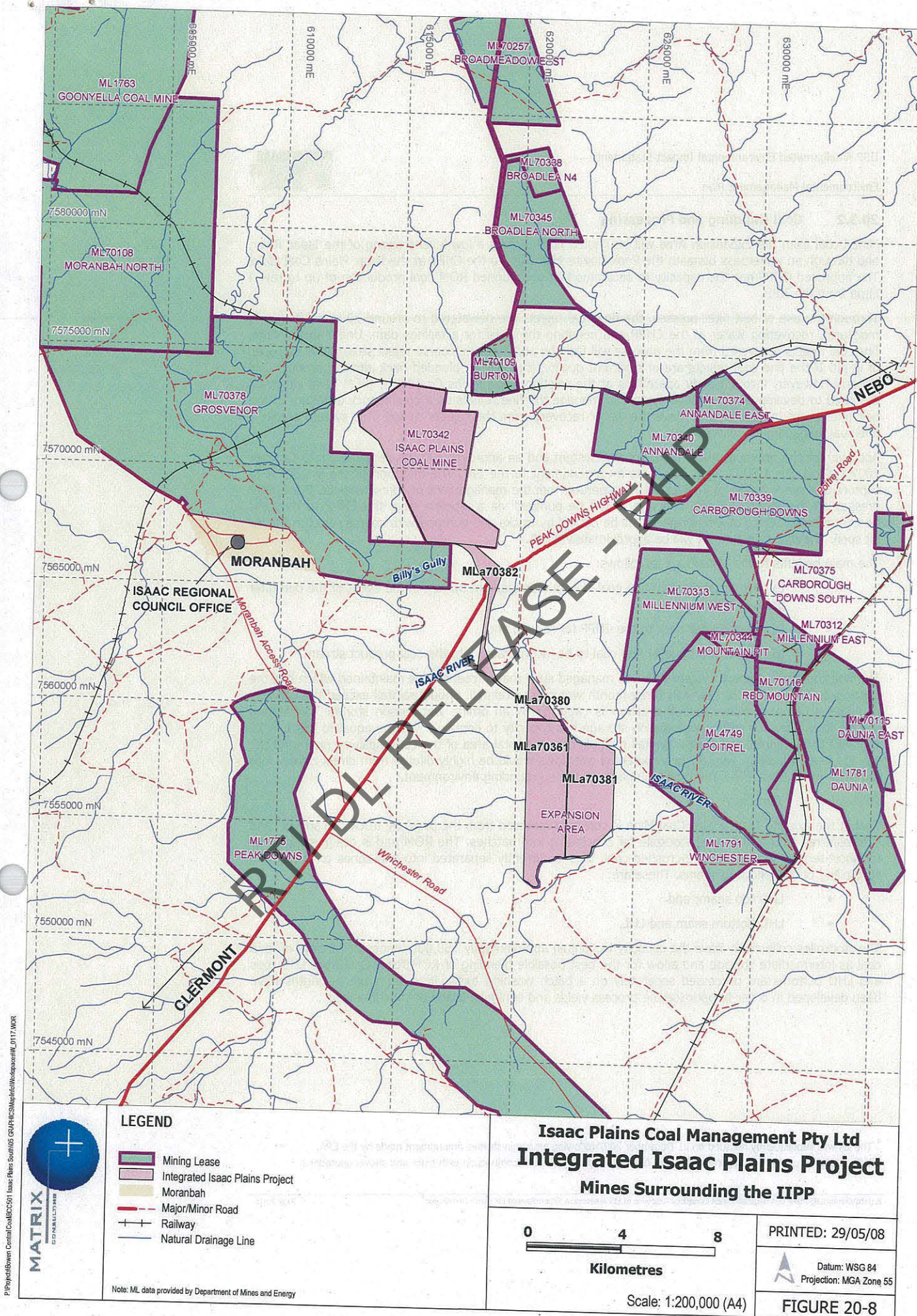














20.3.2 Coal Handling and Processing

Mined coal from the Expansion Area will be hauled north across a low level crossing of the Isaac River, and through an underpass beneath the Peak Downs Highway, to the CHPP at the Isaac Plains Coal Mine. The approved CHPP has the capacity to accommodate the planned ROM coal production of up to raw 4 Mtpa from the IIPP.

Through the use of belt filter presses, the fine coal rejects are dewatered to around 70 % solids (30 % moisture), recovering water at the CHPP and negating the need for a tailings dam. Under this system, fine coal rejects recovered from the process will then be added to the coarse reject stream and disposed of in-pit. If the fine coal rejects are of sufficient quality, they will be blended back into the product coal stream. However, through early operations at the existing Isaac Plains Coal Mine, IPCM have identified the need to develop an alternative system to manage the fine rejects as a contingency to failure of the belt filter press, and to also improve the water recovery from the rejects circuit. This system entails a fine coal management system.

Approval for the fine coal reject management system and an approved EA was received on 25 October 2007 (taking effect 30 October 2007) via an amendment to the EA⁴. The intention of the system is to capture and process fine coal rejects only, separate from the management of coarse rejects. If the filter presses are not operating, the fine rejects will be pumped via a pipeline from the CHPP to the cells described below. Once dry, fine rejects will be hauled by trucks and dumped with coarse reject in the in-pit spoil. The moisture content will be approximately 20 %.

The main benefits to the system are as follows:

- to have an alternative fine coal rejects management system in the event of the belt filter presses failure;
- to recycle water back to the CHPP for re-use; and
- to reclaim good quality fine coal to be incorporated into the coal product stream.

The fine coal management system cells are managed such that a freeboard is maintained which has the capacity to hold a 1 in 20 year ARI three month wet season rainfall. Should rainfall exceed the capacity of these structures, excess rainfall overflow is captured by an offline wet season storage, preventing release from site. The offline wet season storage has capacity to contain a volume equal to the 1 in 20 year ARI three month wet season rainfall multiplied by the total area of the cells, spillway drain and the storage itself. Although very unlikely, potential overflows would be highly diluted from direct rainfall into the cells, minimising any water quality impacts on the surrounding environment.

20.3.2.1 Transport

Coal at the existing Isaac Plains Coal Mine is currently removed from the pit(s) by truck and shovel⁵ and is transferred to the ROM coal stockpile for processing into batches. The ROM pad is designed to allow for short-term stockpiling of pre-crushed coal. This is currently separated into two zones to enable the stockpiling of the following seams. These are:

- LHD top seam; and
- LHD bottom seam and LHL.

The stockpiles collectively have the capacity to contain approximately 150,000 tonnes or 15 days of feed coal as intermediate storage and allow for the best possible blending of ROM feed. Coal from LHD tops and LHD bottoms are processed separately on a batch washing basis. Processing batch lengths have been developed in order to optimise the process yields and minimise usage of consumables.

⁴ The EA was subsequently reissued on 21 December 2007 following an administrative amendment made by the EPA.

⁵ It is proposed construct a dragline in the near future for use at the site in conjunction with truck and shovel operations.



The introduction of the Expansion Area will require a change to the management of the pre-crusher coal. Mining in the Expansion Area will require the following seams to be individually stockpiled:

- Leichhardt (LHD);
- V1 (Vermont (VER); and
- V2.

ROM coal from the Expansion Area will be hauled from the mine pits and separately stockpiled at the ROM coal stockpile located at the northern end of the Expansion Area. Blending will be carried out at the Expansion Area ROM stockpile area to produce a single ROM feed for the CHPP. The Expansion Area coal will be trucked along the access/haul road to the existing ROM stockpile area. If necessary, an extension to the pad at the existing Isaac Plains Coal Mine, within existing cleared areas, will be made to accommodate this coal.

20.3.3 Support Activities

Development of the Expansion Area will provide IPCM with an increased coal reserve which can be accessed largely utilising infrastructure and services that have or are currently being developed for the existing Isaac Plains Coal Mine.

Overburden blasting will be conducted in the Expansion Area to expose coal for mining (as is the case of the Isaac Plains Coal Mine). The explosives storage will remain on the existing Isaac Plains Coal Mine with explosives being transported to the Expansion Area on an as needed basis (refer to **Figure 20-2**). Blasting will be undertaken by specialist contractors. Storage of the explosives is licensed in accordance with the *Explosives Act 1999*.

IPCM propose to construct crib rooms and associated support infrastructure in the Expansion Area. Sewage will be managed by septic system at the main office with capacity for 60 equivalent persons (EP). As with the system at the existing Isaac Plains Coal Mine, this system will be installed *in lieu* of a package sewage treatment plant. The treated sewage is pumped to a transpiration trench on site.

20.3.4 Workforce Requirements

An operational workforce of 70 persons is employed at the existing Isaac Plains Coal Mine, (i.e. 1.9 Mtpa ROM coal operation), with a two shift roster, up to seven days per week.

With the introduction of mining in the Expansion Area, the increase in production from 1.9 Mtpa up to 4 ROM coal, and increased hours of CHPP operations, the workforce required will increase by 40 persons to a total of 110 persons. Mining and associated activities will be undertaken 24 hours per day consisting of two 12 hour shifts, seven days per week. Administration staff working hours are 7 am to 5 pm Monday to Friday.

In addition to staff required for mining operations, approximately 20 persons (potentially peaking at 40 persons for approximately three months to six months) will be required for the construction of the access/haul roads within the Expansion Area and between the Expansion Area and the existing Isaac Plains Coal Mine (including construction of the underpass of the Peak Downs Highway). Construction activities will be completed in a period of approximately three to six months. Construction workers will work during daylight hours only.

Assembly of the dragline will also require a peak workforce of up to 70 persons during the 12 month construction phase.

20.3.5 Workforce Accommodation

Accommodation for the majority of operational and construction personnel will be provided at the MAC Coppabella camp on the Peak Downs Highway, approximately 26 km east of the IIPP and 35 km east of the township of Moranbah. IPCM has a contract with the MAC Coppabella camp for 120 rooms in Coppabella. With the increase in construction and operational personnel at the IIPP, the number of rooms will increase to a maximum of 228 rooms (pers. comm. Mr Craig Bushell, IPCM Compliance Superintendent/Site Senior Executive, 2007). An agreement has been reached with MAC Coppabella camp to allow for fluctuation in demand. This increase will accommodate the dragline construction staff. Some of the workforce, estimated to be approximately 5 %, may choose to live locally in Moranbah.



20.3.6 Workforce Transport

Mine shift workers will be transported to the IIPP site by bus from their camp accommodation as will the majority of contractors during the construction phase. The use of the bus to transport shift workers is intended to reduce the risk of fatigued drivers on the road.

An estimated 200 light vehicles (composed of staff and visitor trips) will enter and exit (i.e. sum of in: out trips) the site on a daily basis during construction. In terms of heavy/other vehicles, an estimated 60 service/deliveries vehicles and minibuses will enter and exit the site daily.

The anticipated trip distribution for traffic accessing the site is as follows:

- 95 % of traffic will be travelling to and from the east (e.g. Coppabella and Mackay); and
- the remainder of 5 % will be travelling to and from the west (e.g. Moranbah).

It is anticipated that the traffic distribution percentages will be the same during construction and full operation.

In addition, assembly of the dragline at the existing Isaac Plains Coal Mine will require a peak workforce of up to 70 persons over approximately 12 months. It is estimated that 40 % of this workforce will travel to the site by buses from the Copabella camp, supplied by IPCM with the remainder travelling in private light vehicles. An allowance for an additional 12 trade visitors per day has also been made.

20.3.7 Notifiable Activities

Notifiable activities are listed in Schedule 2 of the EP Act. Under the EP Act, landowners and local government must inform the EPA that land has been or is being used for a notifiable activity. Land that has been or is being used for a notifiable activity is recorded on the Environmental Management Register, which is maintained by the EPA. Notifiable activities that are currently carried out at the existing Isaac Plains Coal Mine and are proposed for the Expansion Area are listed below.

- **1 Abrasive blasting** - carrying out abrasive blast cleaning (other than cleaning carried out in fully enclosed booths) or disposing of abrasive blasting material.
- **7 Chemical storage** (other than petroleum products or oil under item 29) - storing more than 10 t of chemicals (other than compressed or liquefied gases) that are dangerous goods under the dangerous goods code.
- **14 Engine reconditioning works** - carrying out engine reconditioning work at a place where more than 500L of the following are stored—
 - halogenated and non-halogenated hydrocarbon solvents;
 - dangerous goods in class 6.1 under the dangerous goods code;
 - industrial degreasing solutions.
- **23 Metal treatment or coating** - treating or coating metal including, for example, anodising, galvanising, pickling, electroplating, heat treatment using cyanide compounds and spray painting using more than 5 L of paint per week (other than spray painting within a fully enclosed booth).
- **24 Mine wastes** -
 - storing hazardous mine or exploration wastes, including, for example, tailings dams, overburden or waste rock dumps containing hazardous contaminants; or
 - exploring for, or mining or processing, minerals in a way that exposes faces, or releases groundwater, containing hazardous contaminants.
- **29 Petroleum product or oil storage - storing petroleum products or oil -**
 - in underground tanks with more than 200 L capacity; or
 - in above ground tanks with -
 - (i) for petroleum products or oil in class 3 in packaging groups 1 and 2 of the dangerous goods code—more than 2,500L capacity; or



(ii) for petroleum products or oil in class 3 in packaging groups 3 of the dangerous goods code—more than 5,000L capacity; or

(iii) for petroleum products that are combustible liquids in class C1 or C2 in Australian Standard AS 1940, The storage and handling of flammable and combustible liquids published by Standards Australia - more than 25,000L capacity.

20.3.8 Environmentally Relevant Activities

Environmentally Relevant Activities (ERAs) are defined in Schedule 1 of the *Environmental Protection Regulation 1998*. ERAs are usually industrial activities with the potential to release contaminants to the environment, for example chemical processing, waste treatment, spray painting etc. Mining and petroleum activities are also ERAs. ERAs are used to define the annual licence fees for the site. The ERAs that are currently carried out at the existing Isaac Plains Coal Mine and are proposed for the Expansion Area are listed below.

- **7(b) Chemical storage** - storing chemicals (other than crude oil, natural gas and petroleum products), including ozone depleting substances, gases or dangerous goods under the dangerous goods code in containers having a design storage volume of 1,000 m3 or more.
- **11(b) Crude oil or petroleum product storing** - storing crude oil or a petroleum product in tanks or containers having a combined total storage capacity of 50,000L or more.
- **15(a) Sewage treatment** - a standard sewage treatment works having a peak design capacity to treat sewage of 21 or more equivalent persons but less than 100 EP.
- **23(a) Abrasive blasting** - commercially cleaning equipment or structures using a stream of abrasives if the activity is carried out at a permanent location.
- **24 Boiler making or engineering** - commercial boiler making, electrical machine manufacturing or building or assembly of agricultural equipment, motor vehicles, trains, trams or heavy machinery.
- **25(b) Metal surface coating** - commercial spray painting (other than spray painting motor vehicles), powder coating, enamelling, electroplating, anodising or galvanising in works having an annual throughput of metal products of 2,000 t or more but less than 10,000 t.
- **28 Motor vehicle workshop** - operating a workshop or mobile workshop in the course of which motor vehicle mechanical or panel repairs are carried out in the course of a commercial or municipal enterprise (other than on a farm or under a mining tenement) or on a commercial basis.
- **42 Mineral processing** - commercially processing, classification, mixing or concentration of mineral ores to produce mineral concentrates in works having a design production capacity of more than 100,000 t/yr.
- **62 Concrete batching** - producing concrete or a concrete product by mixing cement, sand, rock, aggregate or other similar materials in works (including mobile works) having a design production capacity of more than 100 t/yr.



20.4 GENERAL

IPCM understand that there are several general conditions which are required to be adhered to in an EA for the IIPP.

20.4.1 Proposed EA Conditions

Proposed EA Conditions	
Financial Assurance	
A1-1	<p>Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.</p> <p>NOTE: The calculation of financial assurance for condition (A1-1) must be in accordance with Guideline 17 and may include a performance discount. The amount is defined as the maximum total rehabilitation cost for complete rehabilitation of all disturbed areas, which may vary on an annual basis due to progressive rehabilitation. The amount required for the financial assurance must be the highest Total Rehabilitation Cost calculated for any year of the Plan of Operations and calculated using the formula: (Financial Assurance = Highest Total Annual Rehabilitation Cost x Percentage Required).</p>
A1-2	<p>The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.</p> <p>NOTE: Where progressive rehabilitation is completed and acceptable to the administering authority, progressive reductions to the amount of financial assurance will be applicable where rehabilitation has been completed in accordance with the acceptance criteria defined within this environmental authority.</p>
Maintenance of measures, plant and equipment	
A2-1	<p>The environmental authority holder must ensure:</p> <ul style="list-style-type: none">a) that all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed;b) that such measures, plant and equipment are maintained in a proper condition; andc) that such measures, plant and equipment are operated in a proper manner.
Prevent and/or minimise likelihood of environmental harm	
A3-1	<p>In carrying out the environmentally relevant activities, you must take all reasonable and practicable measures to prevent and / or to minimise the likelihood of environmental harm being caused. Any environmentally relevant activity, that, if carried out incompetently, or negligently, may cause environmental harm, in a manner that could have been prevented, shall be carried out in a proper manner in accordance with the conditions of this authority.</p> <p>Note: This authority authorises the environmentally relevant activity. It does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition of silence shall not be construed as authorising harm.</p>
Monitoring	
A4-1	<p>Record, compile and keep for a minimum of five (5) years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.</p>
A4-2	<p>Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.</p>
Storage and handling of flammable and combustible liquids	
A5-1	<p>All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of AS 1940 - <i>Storage and Handling of Flammable and Combustible Liquids</i>.</p>
A5-2	<p>Spillage of all chemicals must be controlled in a manner that prevents environmental harm.</p>
Storage and handling of chemicals	
A6-1	<p>All chemicals must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of the relevant Australian Standard.</p>
A6-2	<p>Spillage of all chemicals must be controlled in a manner that prevents environmental harm.</p>
Notification of Emergencies and Incidents	
A7-1	<p>All reasonable actions are to be taken to minimise environmental harm, or potential environmental harm, resulting from any emergency, incident or circumstances not in accordance with the conditions of this environmental authority.</p>
A7-2	<p>As soon as practicable after becoming aware of any emergency, incident or circumstance which results or may result in environmental harm not in accordance with the conditions of this environmental authority, the administering authority must be notified in writing.</p>

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A7-3	The notification of emergencies, incidents or circumstances which result or may result in environmental harm as required by condition number (A7-2) must include but not be limited to the following: a) the holder of the environmental authority; b) the location of the emergency or incident; c) the number of the environmental authority; d) the name and telephone number of the designated contact person; e) the time of the release; f) the time the holder of the environmental authority became aware of the release; g) the suspected cause of the release; h) the environmental harm caused, threatened, or suspected to be caused by the release; and i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.
A7-4	Not more than ten (10) days following the initial notification of an emergency, incident or circumstance which result or may result in environmental harm, written advice must be provided to the administering authority in relation to: a) proposed actions to prevent a recurrence of the emergency or incident; b) the outcomes of actions taken at the time to prevent or minimise environmental harm; and c) proposed actions to respond to circumstances which result or may result in environmental harm.
A7-5	As soon as practicable, but not more than six (6) weeks following the initial notification of an emergency, incident or circumstances which result or may result in environmental harm, environmental monitoring must be performed and written advice must be provided of the results of any such monitoring performed to the administering authority.
A7-6	Contaminants must not be released to the receiving environment unless they are in accordance with the contaminant limits authorised by this environmental authority.
A7-7	This environmental authority does not authorise environmental harm unless a condition contained within the authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.
Definitions	
A8-1	Words and phrases used throughout this Environmental Authority are defined in the Definitions section of this document. Where a definition for a term used in this Environmental Authority is sought and the term is not defined within this document, the definitions in the <i>Environmental Protection Act 1994</i> , its Regulations and Environmental Protection Policies must be used.

20.5 AIR

The EPP (Air) commenced on 1 February 1998. The objective of the policy (Part 2, Section 5) is to achieve the object of the EP Act in relation to Queensland's air environment. The EPP (Air) defines the unreasonable release of a contaminant to the air environment as meaning the release of odours, dust, smoke or other atmospheric contaminants that:

- cause unlawful environmental harm; and
- is unreasonable having regard to the following matters:
 - o its characteristics;
 - o its intrusiveness;
 - o other releases of contaminants at the place affected by the release;
 - o where the effects of the release of the contaminant can be noticed; and
 - o the order in which the person releasing the contaminant started to carry out the activity from which the release is made, and persons affected by the release started to carry out other activities that may be affected by the release of the contaminant.

Schedule 1 of the EPP (Air) nominates relevant air quality indicators and goals. The relevant air quality indicators for the IIPP are:

- total suspended particulate (TSP) concentration of 90 $\mu\text{g}/\text{m}^3$ averaged over a year; and
- a concentration of particulate matter with an aerodynamic diameter of less than 10 μm (PM10) of $\pm 50 \mu\text{g}/\text{m}^3$ averaged over 24 hours, ~~and 50 $\mu\text{g}/\text{m}^3$ averaged over a year~~ exceeded no more than five (5) times per year.



The EPA Guideline "Preparing an Environmental Management Overview Strategy (EMOS) for Non-Standard Mining Projects" contains design limits for the release of dust and particulate matter. It states that dust or particulate matter or both resulting from a mining activity must not cause an environmental nuisance, at any sensitive or commercial place. The maximum permissible measured dust levels comprise:

- dust deposition of 120 mg/m²/day, averaged over one month; and
- PM10 suspended in the atmosphere of $\pm 50 \mu\text{g}/\text{m}^3$ over a 24 hour averaging time, at a sensitive or commercial place downwind of the operational land.

IIPP aims to meet the indicator criteria through the implementation of this EM Plan.

20.5.1 Environmental Values

The environmental values to be enhanced or protected within the IIPP area are the qualities of the air environment that are conducive to:

- the wellbeing of the community or a part of the community, including its social and economic amenity; or
- the wellbeing of an individual without unreasonable interference from intrusive dust.

Existing air pollution is mostly confined to dust generating activities. The principal current sources of particulate emissions include:

- traffic on the various local gravel roads;
- general farming traffic (tractors, trucks, light vehicles);
- farming activities (in particular dust from cultivated areas);
- cattle;
- smoke from occasional grass/bush fires; and
- activities at the surrounding mines including rail load-out and rail movement activities.

Moranbah is the closest township to the IIPP; approximately 7 km from the existing Isaac Plains Coal Mine and 10-12 km from the Expansion Area. As previously noted in **Section 20.2.3** the closest residences to the IIPP are as follows:

-
-
-
- sch4p3(3) Prejudice the protection of an individuals right to privacy
-
-

Homesteads labelled S1 to S4 are the nearest sensitive receptors to the IIPP. **Figure 20-2** and **Figure 20-3** illustrate the locations of surrounding homesteads.

Section 20.2.3 also lists the numerous mines within relatively close proximity to the IIPP as follows:

- Peak Downs Mine;
- Carborough Downs Mine;
- Broadlea Mine;
- Poitrel Mine;
- Millennium Mine;
- Winchester Mine; and
- Moranbah North Mine.



In addition to the above, Burton's Mallowa Train Load-Out is located to the north-east of the existing Isaac Plains Coal Mine.

Figure 20-8 illustrates the location of each of the mines listed above in relation to the location of the IIPP.

20.5.2 Potential Impacts

20.5.2.1 Dust

The potential sources of dust emissions from the IIPP include:

- clearing vegetation and removal of topsoil;
- drilling and blasting overburden;
- removing and relocating overburden;
- extracting and handling coal;
- coal crushing, stockpiling and rail load-out;
- gas emissions from mobile plant exhaust;
- wind erosion of stockpiles and areas of bare soil; and
- vehicle movement on unpaved roads.

In addition to these activities, dust generation will occur through wind erosion of stockpiles and areas of bare soil. Vehicle generated dust is also partially wind generated. The main emission during coal rail transport is wind generated dust.

Sources of dust emissions from the IIPP are distributed over a range of 18 km, from the pit in the Expansion Area, to the CHPP in the existing Isaac Plains Coal Mine to the north, connected by the access/haul road. Dust is produced in this area by different activities that generate dust in varying concentrations. The likely levels of dust emissions at the nearest sensitive receptors have been predicted through modelling. In most cases, the change in the dust levels is determined to be comparatively minor.

It is noted that locations S1, Winchester Downs homestead and S3, Moranbah homestead, have the highest predicted annual average exposure to dust because the access/haul road was modelled as an uncontrolled emission source, i.e. it was assumed, a dry unsealed dirt road; and the prevailing wind directions are to the west. If the road is regularly watered and maintained at a level of least 5% moisture content, as will be the case, the annual average dust would be less than the existing ambient levels, i.e. existing dust emissions will be reduced to approximately 5% of the uncontrolled emissions. In addition, the receptors are downwind of the access/haul road for a significant period of time.

The modelling has predicted that the impacts on the Moranbah Township from the IIPP are likely to be minimal. The modelled concentration of dust deposition for Moranbah under either truck and shovel operations or dragline operations is less than 2 mg/m²/day (27 mg/m²/day including ambient levels). This is well below the EPA limit of 120 mg/m²/day for sensitive or commercial places⁶.

Dust monitoring has been conducted surrounding the IIPP site on a monthly basis from October 2005 to December 2006. A comparison of these results corroborates with the modelled concentrations of dust deposition under truck and shovel operations. It should be noted that for the purpose of this EIS all modelling is based on the future operations of the IIPP, i.e. cumulative modelling of existing Isaac Plains Coal Mine and Expansion Area. The impacts of the existing Isaac Plains Coal mine operations alone (if any) would be observed in the extensive dust deposition records.

The dust deposition modelling results, based on wind statistics provided by the BoM, suggest that the sites to the west of the existing Isaac Plains Coal Mine are currently subjected to higher dust deposition

⁶ EPA Guideline "Preparing an Environmental Management Overview Strategy (EMOS) for Non-Standard Mining Projects" states that the maximum permissible measured dust levels comprise dust deposition of 120 mg/m²/day, averaged over one month; and PM10 suspended in the atmosphere of 150 µg/m³ over a 24 hr averaging time, at a sensitive or commercial place downwind of the operational land.



levels than those to the east. This is likely to occur for the computer modelled wind statistics contained in this report, i.e. based on wind statistics provided by the BoM. However, the wind statistics, based on a meteorological station at the Isaac Plains Coal Mine for the period indicated that the most common wind direction is from the north. It is likely that the recorded dust deposition levels are more likely to be related to local activities such as farming or household activities rather than an indication of mining impacts of the existing Isaac Plains Coal Mine.

The modelling indicates that there will be short-term (24 hr) elevated dust events at most of the sensitive receptors. The highest dust levels are likely to occur at the protection of an homestead, right to privacy the south of the Expansion Area. As the pit moves southwards, the dust levels will increase until maximum disturbance at the southernmost end of the pit, at which point the 24 hr dust concentration criterion is predicted to be exceeded, at least five days annually, during periods of sustained northerly winds. Modelling indicates that it is likely to exceed the criterion for only five days per year. An inspection of the meteorology data has revealed that this occurs during periods of sustained northerly winds. In these cases, all dust sources from the CHPP, access/haul roads, spoil and pit sources are almost linear with the homestead. As a consequence, the dust from all sources contributes to this level of concentration, although the closest sources are the most significant (i.e. the southern extent of activities in the Expansion Area).

However, the modelling assumptions are conservative in that it is assumed none of the PM10 dust generated within the pit will remain (trapped) within the pit and dust from access/haul roads outside the pit are uncontrolled, i.e. worst case scenario, whereas in practice they will be regularly watered.

It is noted that the contours for the PM10 and TSP concentrations are virtually identical at all the sensitive receptors, including the township of Moranbah. The reason is the heavier fractions of dust (represented by the fraction heavier/larger than PM10) falls out of the air fairly close to the source. Lighter fraction PM10 behaves more like a gas and remains in the air for a much longer period of time. It is also noted that the dust concentration contours for operations comprising either truck and shovel or dragline are virtually identical. This is an expected result as the emissions database illustrates that these sources contribute less than 1 % of the total emission sources from the IIPP. Therefore, even though the dragline has higher dust emissions than truck and shovel, it does not significantly influence the overall dust levels from the IIPP activities due to its small contribution to emissions.

Dust emissions from rail transportation were not specifically addressed in this assessment. ~~QR are currently undertaking studies to reduce emissions from all coal haulage operations on the rail network. IPCM will assess the need for, and the options arising from, the QR investigations in order to minimise coal dust emissions during rail transportation. However, IPCM will consult with QR to help limit the coal dust emissions from trains servicing IIPP.~~

The increase in product coal being railed from the site to DBCT results in an increase from three trains per week to six trains per week. This is an increase in the contribution of coal dust emissions on the Goonyella System from approximately 2.2% to 4.6% per annum (based on total coal throughput at Hay Point Terminal (HPT) of 86.3 Mt in 2006-07). There is no change to the total tonnage hauled on the Goonyella line since tonnage is limited by the terminal throughput, which is already at capacity. Since coal dust emissions are related to tonnage hauled then there is unlikely to be any significant change to dust emissions from the Goonyella system. However, total emissions for the Goonyella rail system are expected to remain constant since the total tonnage hauled on the system is limited by the terminals throughput (i.e. HPT and DBCT).

20.5.2.2 Greenhouse Gas

The principal direct and indirect sources of greenhouse gas emissions from the mining activities at the IIPP are as follows:

- the consumption of electricity;
- the consumption of diesel (oxides of carbon, nitrogen and sulphur would also be emitted in vehicular emissions however these emissions are minor in comparison);
- methane emissions from ROM and product coal and some low concentrations of methane emissions at very low concentrations at the coal face (the concentration of methane is not likely to exceed 1 %, and consequently is not considered to have an adverse effect on air quality); and



- overburden and coal blasting.

20.5.3 Environmental Protection Objectives and Control Strategies – Air Quality

Environmental Protection Objectives And Control Strategies – Air Quality	
Environmental Value	Existing ambient air, with some elevated particulate concentrations during dry periods from fire and surrounding grazing lands and existing mining activities on site and in surrounding areas.
Environmental Protection Objective	Maintain ambient air quality levels and ensure sensitive receptors are not adversely affected. The release of dust or particulate matter or both resulting from the mining activities will not cause an environmental nuisance, at any sensitive or commercial place.
Performance Indicators/Criteria	No unlawful nuisance air quality levels at sensitive receptors. Number of air quality related complaints.
Control Strategies & Commitments	<p>Dust Controls</p> <p>All internal roads and unsealed external roads in the vicinity of residences traversed by vehicles associated with IIPP will be watered on an as needs basis. In particular, a 2 km section of the haul route between the Expansion Area and the CHPP, north-north-west of the ROM coal stockpile, should be regularly watered. The rate of watering should be increased during dry periods or during periods of high winds.</p> <p>Vehicular access within the site should be strictly limited to authorised vehicles and designated routes, i.e. bitumen and major haul/access roads.</p> <p>Limit the internal speed on unsealed roads to 80 km/h on the southern part of the access/haul road, slowing to 60 km/h 1 km before the Peak Downs Highway underpass, then 60 km/h for remainder to CHPP/MIA/active pits.</p> <p>Dump truck routes should be kept as short as practicable.</p> <p>Spoil will be removed and dumped as soon as practicable after blasting, i.e. drying time will be limited where practicable.</p> <p>Avoid topsoil stripping and replacement on days when the wind speed is sufficient to carry visible dust beyond the mine lease boundary.</p> <p>Vehicles (other than mining machinery) should not be permitted on overburden dumps except for the purposes of rehabilitation.</p> <p>Exposed areas should be rehabilitated (with grasses and vegetation) at the earliest possible timeframe. Rehabilitation will be completed in accordance with Section 20.9.3 and the PoO for the IIPP.</p> <p>Drop heights of coal and overburden from mining machinery will be kept to a minimum. IPCM will establish tall vegetation around dust generating areas within the IIPP to encourage dust fallout.</p> <p>Avoid burning of cleared vegetation where practicable. If vegetation is required to be burnt, ensure that wind is not blowing toward sensitive receptors.</p> <p>Provide dust suppression sprays at locations in coal handling facilities that produce excessive dust (e.g. crusher, conveyor and coal stockpiles).</p> <p>IPCM will conduct further detailed air quality assessment of the operations during initial stage of mining in the Expansion Area to identify and develop adequate controls to mitigate or negate potential impacts on Winchester Downs.</p> <p>A shut-down procedure (<u>Trigger Action Response Plan (TARP)</u>) will be implemented at the site in the event of <u>monitored exceedences of the dust criteria identified by real-time monitoring, significant and sustained adverse meteorological conditions. The procedure will be set up for use at the commencement of mining activities in the Expansion Area.</u></p> <p>Complaints/Monitoring</p> <p>When requested by the administering authority, IPCM will undertake dust and particulate monitoring within a reasonable and practicable timeframe to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place. The results will be notified within <u>fourteen (14) days</u> to the administering authority following completion of monitoring.</p> <p>If the IPCM can provide evidence through monitoring that the following limits are not being exceeded then the holder is not in breach of their objective:</p> <ol style="list-style-type: none"> dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulates - Deposited matter - Gravimetric method of 1991; and a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of <u>150 micrograms per cubic metre over a 24 hour averaging time, at a sensitive or commercial place downwind of the operational land can be exceeded no more than five (5) times per year</u>, when monitored in

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accordance with:

- particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet - Gravimetric method, when monitored in accordance with AS 3580.9.6 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM (sub) 10 high volume sampler with size-selective inlet - Gravimetric method of 1990; or
- any alternative method of sampling PM10, which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

NOTE: IPCM will propose which monitoring method is appropriate in accordance with the above required monitoring.

If monitoring indicates exceedence of the above limits IPCM will:

- a) address the complaint including the use of appropriate dispute resolution if required; and
- b) immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.

Record complaints in site complaints/incidents register.

IPCM will maintain the existing dust deposition monitoring network for the foreseeable future and assess the monthly depositional records. These results will be critically reviewed on an as-required basis to determine if the mining activities are causing an increase in dust deposition above that predicted by the modelling completed as part of the EIS for the IIPP. Results will be analysed along with prevailing meteorology and mining rates/mining processes.

Real-time low volume dust samplers will be installed in two locations, one between the existing Isaac Plains Coal Mine and the township of Moranbah and the other between the Expansion Area pit and Winchester Downs homestead, as close to the homestead as practical. These monitors allow for ongoing monitoring of dust levels at these locations which may occur as a result of activities at the IIPP. The dust monitors are also fitted with wind speed/direction logger and a filter which permits subsequent analysis to verify the origin of dust components and will be linked via telemetry to the site communications-system real time data management system including an exceedence alarm.

The real-time monitors allow for analysis of dust levels and permit correlation of dust exposure with wind direction. This method of monitoring will enable IPCM to carry out a regular review of the daily dust data to determine whether additional controls would be required, especially in relation to the operations in the southern section of the Expansion Area pit.

Additional controls may will involve regularly assessing the real-time air quality results (24hr PM₁₀) and meteorological data and operations relocated, modified and/or stopped as required.

A shut down procedure, the Trigger Action Response Plan (TARP), will involve the following conditions:

- a) real time screening monitoring of PM₁₀ > 50 µg/m³ will trigger an immediate alarm notification to the site Environmental Officer (EO). The EO will conduct an investigation of meteorological conditions and site activities to confirm whether the mine is the cause of the exceedence;
- b) dust and wind activities monitored to confirm whether mine is source of dust causing exceedence;
- c) if mine is the source of dust which is causing an exceedence then:
 - i) the dust generating activity will be relocated to an area that does not adversely impact neighbouring sensitive receptors; or
 - ii) the dust generating activity will be ceased.

Greenhouse Gas Emissions

Use fuel and electricity as efficiently as possible and require contractors to conduct preventative maintenance on equipment and engines to reduce excessive greenhouse gas emissions.

Ensuring equipment is maintained to retain high levels of energy efficiency.

Minimising clearing – to minimise loss of vegetation sinks.

Minimising burning of vegetation – to minimise emissions to the atmosphere.

Greenhouse awareness training as part of site inductions to make employees aware of the science of global warming and efforts to minimise emissions.

Promoting recycling.

Diesel efficiency considerations will be included in assessments of new mobile and fixed equipment – the less diesel used the less CO₂ emitted during combustion.

Electrical efficiency considerations will be included in assessments of new mobile and fixed equipment – the less electricity used the lower the externally emitted CO₂ level per tonne of coal produced.

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Environmental Protection Objectives And Control Strategies – Air Quality

Participation in the Australian Government's Energy Efficiency Opportunities (EEO) program.
Development and maintenance of an inventory of Greenhouse emissions and sinks to be aware of the extent of site emissions.
Record site diesel and electricity use and explosives use to determine annual greenhouse gas emissions.
Record all emissions as required by the National Pollution Inventory (NPI).
Burning of waste vegetation from land clearing activities will not be undertaken without the appropriate permit. Neighbours will be notified at least 24 hours prior to burning of vegetation and no burning will take place if the average forecast wind speed is greater than 10 knots.
Vale may consider participating in the Australian Government's Energy Efficiency Opportunities (EEO) program which came into effect in mid 2006. This program encourages large energy-using businesses to improve their energy efficiency by requiring businesses, using more than 0.5 Petajoules a year of energy, to identify, evaluate and report publicly on cost effective energy savings opportunities. The initial public report will be required by the end of 2008.

20.5.4 Proposed EA Conditions

Proposed EA Conditions

Dust Nuisance

B1-1	Subject to Conditions (B1-2) and (B1-3) the release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
B1-2	When requested by the administering authority <u>or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer)</u> , dust and particulate monitoring must be undertaken, and the results <u>thereof notified to the administering authority within fourteen (14) days following the completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place.</u>
B1-3	<u>Dust and particulate matter must not exceed the following levels when measured at any nuisance sensitive or commercial place:</u> a) Dust deposition of 120 milligrams per square metre per day, averaged over one <u>month</u> year, when monitored in accordance with <u>Australian Standard AS 3580.10.1 of 2003 (or more recent editions)</u> ; and b) <u>A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site can be exceeded not more than five (5) times per year, when monitored in accordance with:</u> - <u>Australian Standard AS 3580.9.6 of 2003 (or more recent editions) Ambient air – Particulate matter – Determination of suspended particulate matter - PM₁₀ high-volume sampler with size-selective inlet - Gravimetric method; or</u> - Any alternative method of sampling PM ₁₀ , which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority. NOTE: <u>You must propose which monitoring method is appropriate in accordance with condition (B1-3) (a) or (b) or both.</u>
B1-4	If monitoring indicates exceedence of the relevant limits in Condition (B1-3), then the environmental authority holder must investigate <u>whether the exceedence is due to emissions from the activity. If the mining activity is found to be the cause of the exceedence then the environmental authority holder must:</u> a) address the complaint including the use of appropriate dispute resolution if required; and b) immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.
B1-5	<u>Prior to dragline use PM10 monitoring equipment must be installed between the current Isaac Plains coal mine and the Moranbah township. Real time results must be linked via telemetry to a real time data management system including an exceedence alarm. The proponent's website will be updated no less then weekly to enable public access to the results.</u>
B1-6	<u>At least twenty-eight (28) days prior to dragline use the environmental authority holder must submit to the administering authority a site shut-down procedure for the existing site and expansion area in the event of significant and sustained adverse meteorological conditions which may result in elevated dust emissions in the direction of the Moranbah township based on trends from background and/or ongoing monitoring results in condition B1-5. The site shut-down procedure must be implemented.</u>

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20.6 WATER

Under the EPP Water, 'waters' has the meaning of bed and bank of waters and 'surface waters' means water other than groundwater, i.e. surface water meaning water above the ground surface and groundwater meaning water below the ground surface.

The term 'waterway' is used generically throughout this EM Plan and includes 'watercourses' defined under the Water Act and 'drains' that do not meet with watercourse criteria under the Water Act.

20.6.1 Surface Water

20.6.1.1 Environmental Values

The IIPP is located within the Fitzroy Basin (refer to **Figure 20-9**). The IIPP is dissected by the Isaac River, a major river system of the Fitzroy Basin catchment. The existing Isaac Plains Coal Mine is located to the north of the Isaac River and the Expansion Area to the south.

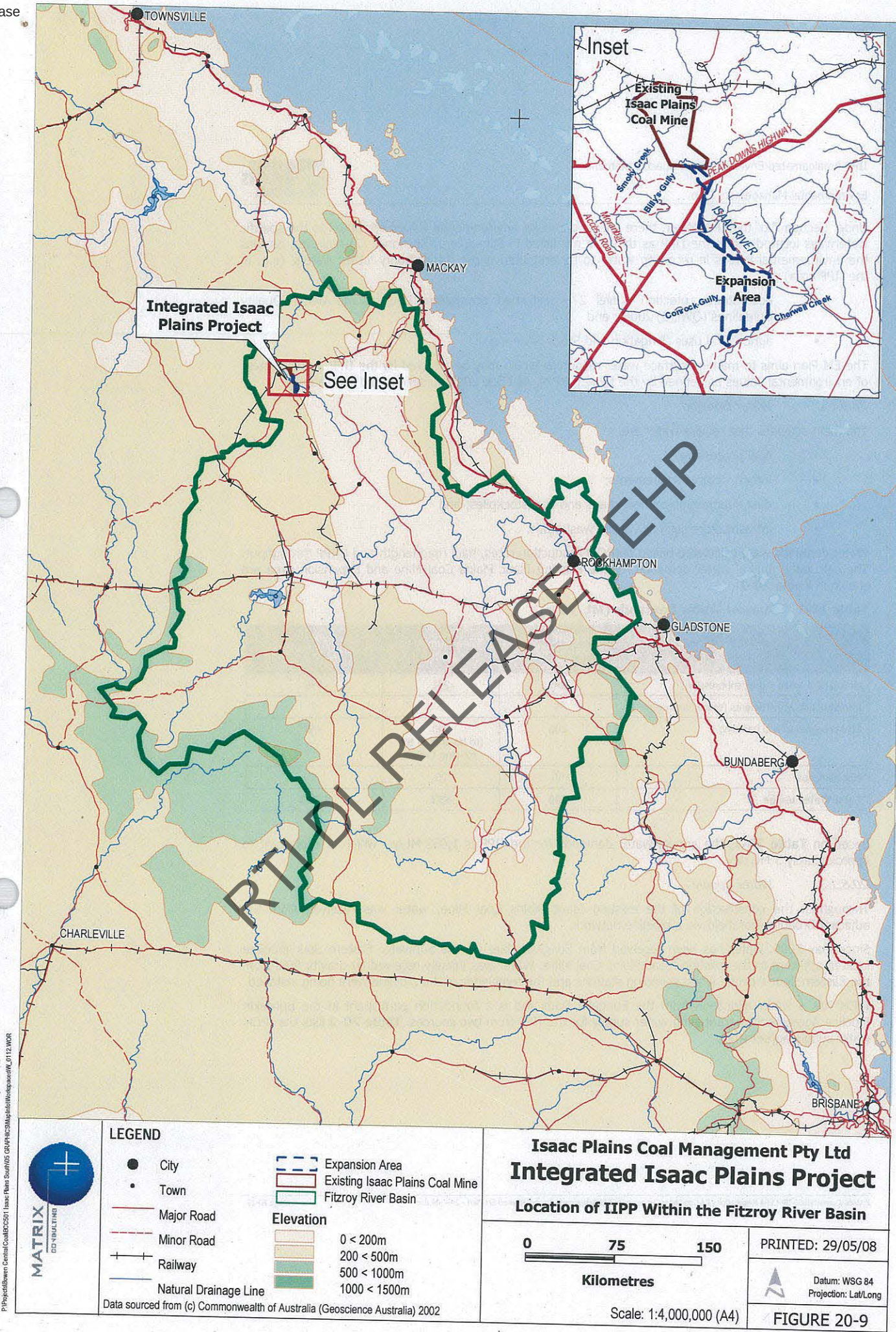
The Isaac River catchment upstream of the IIPP comprises mainly scattered to medium dense bushland, grazing land and with the township of Moranbah, located approximately 7 km from the existing Isaac Plains Coal Mine. Several coal mines already exist in this catchment upstream of the site, including Moranbah North, Goonyella, Riverside, North Goonyella, Burton and Broadlea, and several downstream, including Carborough Downs, South Walker Creek, Broadmeadow, Millennium, Moorvale and Coppabella (refer to **Figure 20-8**).

Smoky Creek and a drainage line known locally as Billy's Gully traverse the existing Isaac Plains Coal Mine and are tributaries to the Isaac River. IPCM are proposing to divert Smoky Creek to access economic coal reserves beneath the waterway.

The Expansion Area is bounded to the north by the Isaac River and south by Cherwell Creek. Conrock Gully traverses through the centre of the proposed mine pit and will require diversion to facilitate mining.

Cherwell Creek is a major tributary of the Isaac River, and both the Isaac River and Cherwell Creek are subject to flooding, with the extent of flooding associated with the Isaac River posing a risk of flooding of the open cut Expansion Area coal pit. Flood levees will be required to reduce the flood risk from the Isaac River to the mine. Levees will be constructed prior to the commencement of mining in the Expansion Area.

Smoky Creek, Billy's Gully, the Isaac River, Cherwell Creek and Conrock Gully are all ephemeral systems with the majority of flows typically occurring intermittently following storm events in the wet season from December to March. Smoky Creek, Billy's Gully, the Isaac River and Cherwell Creek are regarded as waterways for the purposes of the Water Act.





Under Section 7 of the EPP Water, there are no particular environmental values attributed to the specific waterways located within the IIPP as they are not listed in Schedule 1. Section 7 (2) however, assigns the environmental values in receiving water to be protected under the category 'other waters' (e.g. in the IIPP area) as:

- ecosystem protection (Level 2 – disturbed ecosystems, Queensland Water Quality Guidelines (QWQG) 2006); and
- agricultural uses (Irrigation and Stock Watering).

The EM Plan aims to manage surface water resources which may be affected by the IIPP in the context of environmental values as defined by the EP Act, EPPs, ANZECC 2000 guidelines and regulations.

20.6.1.2 Water Demand

The main activities that require water are:

- coal processing;
- infrastructure requirements;
- dust suppression on haul roads and coal stockpiles; and
- infrastructure such as vehicle washdown.

Water demands were calculated based on ROM production rates, haul road length and CHPP throughput. The calculated annual water demands for the existing Isaac Plains Coal Mine and Expansion Area are shown in **Table 20-1**.

Table 20-1 Annual Water Demands (ML/year)

Activity	Existing Isaac Plains Coal Mine (ML)	Expansion Area (ML)	Total (IIPP) (ML)
Mining haul roads – dust suppression	245	291	536
Infrastructure requirements (office, wash-down)	5	2	7
Coal preparation and handling	200	240 (to be used in the existing CHPP)	440
Miscellaneous	50	20	70
Total Water usage	500	553	1,053

Based on **Table 20-1**, the annual water demands for the IIPP is 1,053 ML/yr, which is equivalent to approximately 3 ML/day.

20.6.1.3 Water Supply

Throughout the construction of the existing Isaac Plains Coal Mine, water was received from the adjacent Broadlea borefield via a pipeline network.

Since May 2006, water has been received from Eungella Dam via the Sunwater Eastern Spur pipeline located adjacent to the existing Isaac Plains Coal Mine. Water was initially received by gravity feed from the Eastern Spur Pipeline whilst pumping stations and the remainder of the pipeline were being installed.

IPCM has a water allocation from the Eungella Dam and is a foundation participant in the Burdekin Pipeline Agreement guaranteeing water supply for the IIPP from two sources. **Table 20-2** lists the IPCM water supply agreements.

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**Table 20-2 Water Supply Agreements**

Water Agreement	Term	Quantity Per Annum	Special Conditions
Eungella Water Pipeline	01 November 2005 to 31 December 2020 i.e. 15 yrs subject to extension provisions.	540 ML-1st allocation to 01 July 2008. 380 ML additional taking total to 920 ML	Agreement is between Vale and Eungella Water Pipeline Company but assignment to IPCM is committed. However, assignment deed is pending. IPCM has been receiving water since May 2006.
Burdekin River Delivery and Pipeline Transportation	15 December 2005 for a period of 20 yrs (i.e. to 2025).	920 ML (2008) 540 ML (2007)	IPCM may request extension to term of at least 10 yrs, no earlier than 3 yrs and no later than 1 year prior to the expiry date.
Eastern Spur Pipeline	For a period of 20 yrs after operations date occurs (7 days after Eungella advises stage 1 is complete, commissioned and operational).	938 ML	Commencement date occurs 7 days after Eungella advises Stage 2 is complete and operational. IPCM may request an extension for a term of at least 10 yrs, no earlier than 3 yrs and no later than 18 months prior to the expiry date.

NB: The Eastern Spur Pipeline (ESP) delivers both the Burdekin and Eungella water to the project site from Moranbah. As the ESP is limited to 920 ML/pa, the project supply is limited to this despite the collective allocation being 1840 ML/pa.

20.6.2 Potential Impacts**20.6.2.1 Surface Water Hydrology**

Potential impacts on surface water hydrology from the IIPP are summarised in **Table 20-3** below.

Table 20-3 Aspects/Potential Impacts – Surface Water Hydrology

Aspect	Purpose	Potential Impact
Construction and operation of the mine within the Expansion Area.		Run-off from large areas of disturbed ground, including haul roads, waste rock dumps, pre-strip areas, together with a ROM coal stockpile and water extracted from mine pit highwalls. Contaminants from these areas have the potential for localised impacts on Cherwell Creek and the Isaac River within and immediately downstream, of the mine site. There is also the potential for regional impacts in the lower reaches of the Isaac and Connors River system, both located within the Fitzroy Basin.
Diversion of Conrock Gully to the Isaac River/Conrock Gully Dam.	To enable access to economic coal reserves beneath Conrock Gully and to enable mining of the Expansion Area as a continuous pit.	Redirection of flows into Isaac River approximately 4 km upstream of the current confluence. Erosion and scour of the diversion has the potential to cause sedimentation if not appropriately engineered. Inundation area upstream of diversion dam. Reduction/attenuation of streamflow due to storage. Provision of water for stock watering.
Construction of a <u>Q500 plus 0.5 m freeboard</u> levee approximately <u>8.3 km in length</u> and the <u>construction of a PMF levee</u> approximately <u>8.9 km in length</u> , <u>4.2 km in length on the western side of the Isaac River from 1 km upstream of the proposed pit to the southern side of Conrock Gully.</u> The levee height will be up to 1 m above the 1% AEP flood height.	To protect mining operations in the Expansion Area from flooding.	Changes in flood patterns, increasing upstream and downstream flood risks and, potentially, erosion and scour.

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Aspect	Purpose	Potential Impact
Diversion of Smoky Creek - northern bank of the diversion will run alongside the outer spoil dump of Pit S1 with the southern bank excavated into the earth opposite Pit S2.	To enable access to economic coal reserves beneath Conrock Gully and to enable mining of the expansion area as a continuous pit-Smokey Creek.	Erosion and scour of the diversion could cause sedimentation if not appropriately engineered.
Low level crossing at or above bed level of the Isaac River.	To enable ROM coal to be hauled on internal roads to the CHPP located at the existing Isaac Plains Coal Mine approximately 14 km to the north.	The potential for obstruction of flow and fish passage and also sedimentation of structures. Construction at or just above the bed level will be required rather than a culvert due to the sediment loads within the River, while not obstructing flows. Potential for disturbance of fauna corridors. Potential for interruption to subsurface alluvial groundwater bed flows.
Dragline crossing of Isaac River (approximately 2016).	On completion of mining the existing Isaac Plains Coal Mine, it will be necessary to 'walk' the dragline south across the Isaac River to the Expansion Area. Both dragline and truck and shovel methods will be employed for the IIPP.	Potential disturbance to the bed and banks of the Isaac River.
Backfilling of void from floodplain and buttressing the levee into the spoil dump.	To further eliminate the risk of overtopping the levee and/or levee failure and to provide flood protection to the final void south of the 202-m AHD contour-PMF level.	Some erosion and scour of the levee and/or backfilled area could cause sedimentation if not appropriately engineered.

20.6.2.2 Mine Water Management System

Overview

The activities associated with the IIPP have the potential to impact on water quality from the sources summarised in **Table 20-4**.

Table 20-4 Potential Water Contamination Sources

Sources	Potential Contaminants
Overburden dump and coal stockpile	Run-off containing suspended solids and dissolved salts
Pit	Suspended solids and dissolved salts
Infrastructure	Petroleum hydrocarbons, detergents, degreasers suspended solids
Septic system	Coliform bacteria and nutrients
Fine Coal Management System	pH, arsenic and Cu

To minimise the potential for impacts on the water quality of waterways downstream of the IIPP, a mine water management system has been designed and is in operation for the existing Isaac Plains Coal Mine and a conceptual design has been prepared for the Expansion Area. The design philosophy for the mine water management system is to manage water in three types of catchments based on water quality:

- **'Clean'** – surface runoff from areas where water quality is unaffected by mining operations. Clean water includes runoff from undisturbed areas and any fully rehabilitated areas;
- **'Dirty'** – surface runoff water from areas that are disturbed by mining operations. This runoff may contain silt and sediment or high salt concentrations, but does not contain contaminated material. However, this runoff must be of sufficient quality prior to discharge into natural water courses, if required; and
- **'Contaminated'** – surface water from areas affected by mining operations and potentially containing chemicals of various types used in the mining operations. There are restrictions on the use and release of this water. Contaminated water areas include sumps, stockpile areas, service bays and fuel storage areas. Rainfall and resulting runoff



from these areas are also potentially contaminated and therefore must be managed to avoid discharge of potentially contaminated water into the natural water courses.

A water balance model was used to design the mine water management system. The model identified water supply and discharge requirements based on water demands to operate the mine and water generated through the operations.

The general principles to manage surface water for the various construction and mining phases of the IIPP are as follows:

- the fullest separation possible of clean, dirty and contaminated water runoff;
- minimise the area of surface disturbance, thus minimising the volume of dirty or contaminated runoff;
- contain and reuse on site any dirty water runoff that has high sediment or salinity concentrations whenever possible. If not, release it in a controlled manner in compliance with adopted water quality compliance criteria;
- collect and contain all potentially contaminated water on site. Recycle this water for use on the site without releasing it to the natural watercourses. If not, treat this water to adopted water quality compliance criteria prior to release into the surrounding environment; and
- maximise the use of on-site water and thus minimise the need for external water.

In relation to the diversions, the main mechanism of potential impact on water quality comes from the physical characteristics of the flow (i.e. hydraulics). Appropriate engineering design will reduce these potential impacts.

Existing Isaac Plains Coal Mine

A mine water management system was conceptually designed and included in the Environmental Management Overview Strategy (Matrix+ Consulting, November 2005) lodged in support of obtaining the environmental authority under the *Environmental Protection Act 1994* in 2005.

The existing Isaac Plains Coal Mine has two lawful release points, including:

1. Release point 1 (W2) — from Release Dam 1 (RD1) into Smoky Creek; and
2. Release point 2 (W4) — from Release Dam 2 (RD2) into Billy's Gully.

~~In order to protect downstream water quality, controlled releases will only occur when existing flows in Smoky Creek and Billy's Gully respectively, are large enough to enable a minimum dilution ratio to satisfy the criteria that discharges should result in less than a 10 % increase in background water quality. This ensures that salts, sediments and other contaminants contained in mine water can be accommodated by the natural hydrological system, by diluting these to levels that do not cause environmental harm.~~

~~A design dilution ratio was calculated (refer to Table 20-5) based on estimates of the water quality contained within the release dams and from the water quality of the Isaac River (i.e. where there is sufficient data available and which Smoky Creek and Billy's Gully ultimately report to). In relation to the water quality contained within the release dams, the limiting water quality parameter for coal mines in the Bowen Basin is conductivity, due pit water inflows and saline soils. As pit water inflows comprise direct rainfall, inflows from aquifers above the coal seam and inflows from the coal seams, the estimated conductivity of mine water was based on a weighted average of the total dissolved solids (TDS) concentrations and flow volumes for groundwater inflows to the pits, direct rainfall over the pit and runoff and from the coal stockpiles and spoil emplacements. The estimated in-pit conductivity is similar to values observed at operational mines in the area.~~

Table 20-5 — Calculation of Dilution Ratio — Existing Isaac Plains Coal Mine

	Conductivity (µS/cm)
Background Level (Isaac River)	511
Estimated pit water conductivity (from groundwater quality data)	7788
Target Conductivity (10 % above background)	562

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Thus $511Q1 + 7788Q2 = 562Q3$. Solve equation for $Q2:Q1$

Dilution Ratio

140:1

A water management system has been approved and implemented which:

- segregates clean water from entering the project area via a system of diversion drainage lines and levees;
- reduces runoff from spoil emplacements by shaping and progressive rehabilitation using a system that of appropriately designed sediment control structures and then into the site release dams. The crest and plateaux of the dumps will be shaped to mimic the pre-mine landform of undulating topography common to the Brigalow Belt;
- redirects run-off from areas that involve soil disturbance into sedimentation dams located at the lower end of the catchment of disturbed areas. Sediment dams are to be designed in accordance with the Institute of Engineers Australia, Queensland Division (IE Aust) Soil Erosion Guidelines for Queensland Construction Sites (1996);
- contains run-off from the coal handling and preparation plant area, haul roads, and un-rehabilitated areas;
- bunds the mine infrastructure area to prevent external flows entering the area, capturing and directing run-off from within the area to a dam, using the water collected in the dam for washdown, and containing and treating washdown waters via an oil/water separator. All hydrocarbon and petroleum products shall be bunded in accordance with AS1940 Storage and Handling of Flammable and Combustible Liquids;
- appropriately treats on-site sewerage via a package treatment plant/septic tanks/land irrigation system;
- re-uses water from the water management system to meet on-site demands, thereby reducing the need for discharging the water;
- controls the (infrequent) discharges of mine water to Smoky Creek and Billy's Gully ~~under high flow conditions, with sufficient dilution (minimum 140:1)~~ to avoid adverse environmental impacts;
- designs the mine water management system (in the rare and unexpected event of flood failure) to overflow to the pit, rather than to the natural drainage system;
- contains fine coal rejects and water in the unlikely event of cell failure of the fine coal management system; and
- contains discharge from dewatering of the belt press filters and tailings dam in the fine coal management system.

Figure 20-10 illustrates the mine water management system for the existing Isaac Plains Coal Mine.

All dams are designed to provide full containment of storm events up to the 1 in 10 year, 24 hour event from their respective catchments. Note that almost all mine water will be recycled rather than discharged. Controlled mine water discharges will only occur during a limited number of high flow events.

Because mining methods will include via truck and shovel method, box-cut spoil and internal spoil areas can be reshaped during placement. Runoff from the external box-cut slope will drain externally with the spoil dumps to be shaped to encourage internal ponding. External runoff from these areas will be controlled by sediment dams designed in accordance with the sediment and erosion control guidelines (IE Aust, 1996) with a typical length to width ratio of 3:1, combined with storage to contain the 24 hour, 1 in 10 year event. This allows sufficient settling time to reduce sediment loads to acceptably low levels.

During initial phases of rehabilitation, it is expected that dissolved solids in the runoff may be high. During this period, runoff treated in sediment dams will report to the mine water management system. After a sufficient period (nominally four years) to allow revegetation and leaching of salts from the upper soil profiles, grab sampling of outflows of sediment dams will be undertaken to confirm that concentrations of salts in the runoff are within acceptable levels in receiving waters. When this is



verified, outflows from the sediment dams will be directed into the natural drainage system and will no longer be part of the mine water management system.

Groundwater inflows into active pits are captured in sumps and pumped as required to either a pit dewatering dam, or directly into a release dam.

The results of the geochemical testing indicates that overburden at the existing Isaac Plains Coal Mine indicates that overburden and coarse rejects will be non-acid forming, however fine coal rejects are considered potential acid forming (PAF).

As noted in **Section 20.3.2**, through the use of belt filter presses, the fine rejects are dewatered to around 70 % solids (30 % moisture), recovering water at the CHPP and negating the need for a tailings dam for the development of the existing Isaac Plains Coal Mine. Under this system, fine coal rejects recovered from the process will then be added to the coarse reject stream and disposed of in-pit. However, through early operations, IPCM have identified the need to develop an alternative system to manage the fine rejects as a contingency to failure of the belt filter presses, and to also improve the water recovery from the rejects circuit. This system entails a fine coal management system. The fine coal management system consists of engineer designed cells to allow for separation of the fines and the supernatant, with the supernatant reused in the CHPP. For further detail refer to **Section 20.3.2**.

Expansion Area

A conceptual mine water management system has been designed for the Expansion Area. The Expansion Area features the same aspects of the mine water management system as the existing Isaac Plains Coal Mine, however has less operational sources of potential contaminants as the Expansion Area will not require a CHPP or rail loop.

The conceptual mine water management system for the Expansion Area is illustrated in **Figure 20-11**. During the construction and operation of the mine within the Expansion Area, drainage from operational areas will include run-off from large areas of disturbed ground, including haul roads, waste rock dumps, pre-strip areas, together with a ROM coal stockpile and water extracted from mine pits. Contaminants from these areas have the potential for localised impacts on Cherwell Creek and the Isaac River within and immediately downstream of the Expansion Area site. Similar to the existing Isaac Plains Coal Mine, all mine water will be contained in Release Dam 3 (water collected in the MIA Retention Pond to be pumped to the Release Dam 3) and releases will only occur under controlled conditions ~~when existing flows in the Isaac River are large enough to enable a minimum dilution ratio to satisfy the criteria that discharges should result in less than a 10 % increase in background water quality in accordance with the relevant EA conditions.~~ If water from the MIA Retention Pond is not required, and the quality of the captured runoff meets the water quality compliance criteria, water from the MIA Retention Pond water may be pumped directly to the Isaac River.

The proposed release points from the Expansion Area are as follows:

- release point 3 – from Release Dam 3 (RD3) into the Isaac River; and
- release point 4 – from MIA Retention Pond (MRP1) into the Isaac River.

~~A design dilution ratio was calculated (refer to **Table 20-6**) based on estimates of the water quality contained within Release Dam 3 and the MIA Retention Pond and from the water quality of the Isaac River.~~ In relation to the water quality contained within Release Dam 3 and the MIA Retention Pond, the limiting water quality parameter for coal mines in the Bowen Basin is conductivity, due to pit water inflows and saline soils. As pit water inflows comprise direct rainfall, inflows from aquifers above the coal seam and inflows from the coal seams, the estimated conductivity of mine water was based on a weighted average of the total dissolved solids (TDS) concentrations and flow volumes for groundwater inflows to the pits, direct rainfall over the pit and run-off and from the coal stockpiles and spoil emplacements. The estimated in-pit conductivity is similar to values observed at operational mines in the area.

Table 20-6 — Calculation of Dilution Ratio — Expansion Area

	Conductivity (µS/cm)
Background Level (Isaac River)	404
Estimated pit water conductivity (from groundwater quality data)	5,700

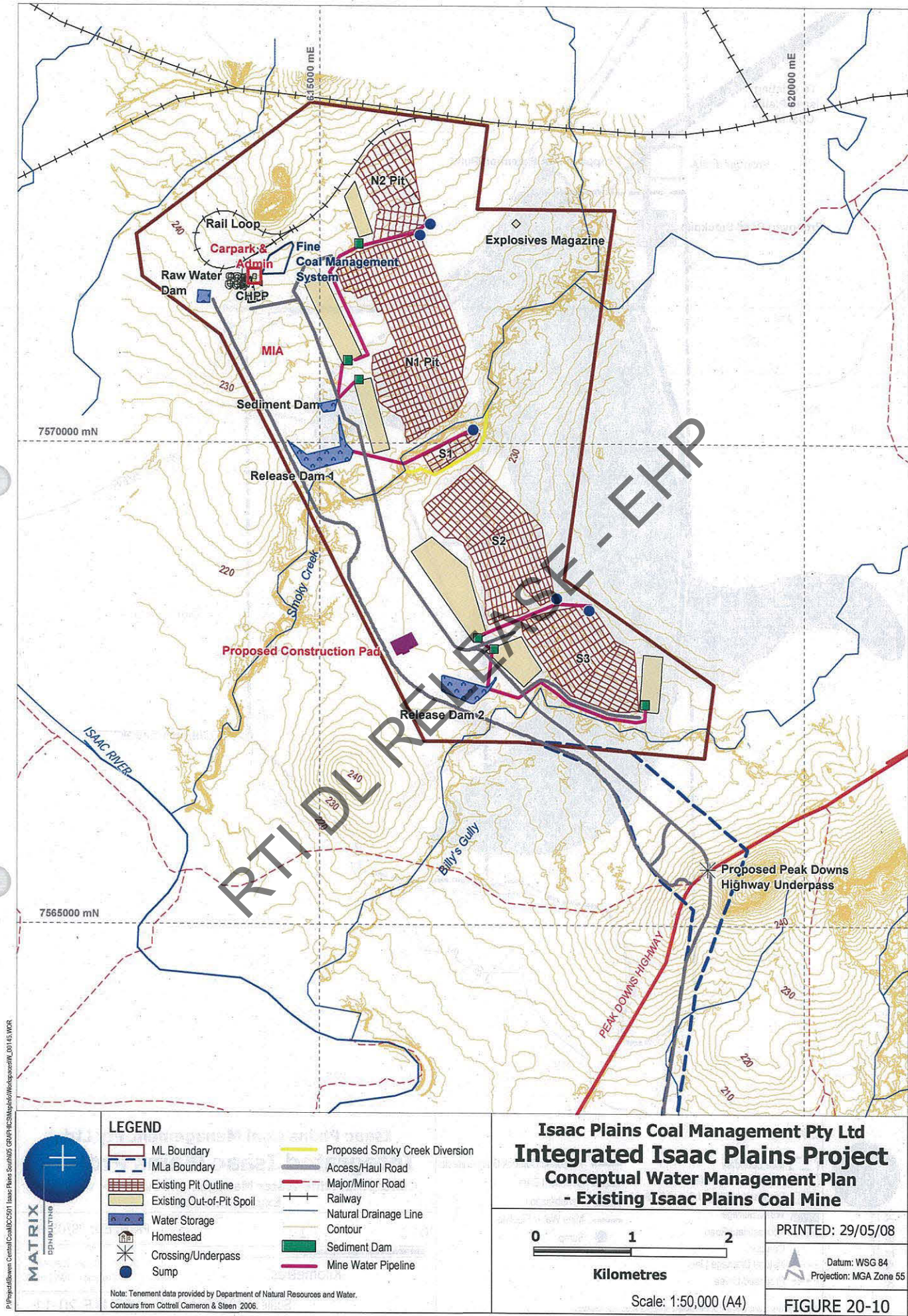
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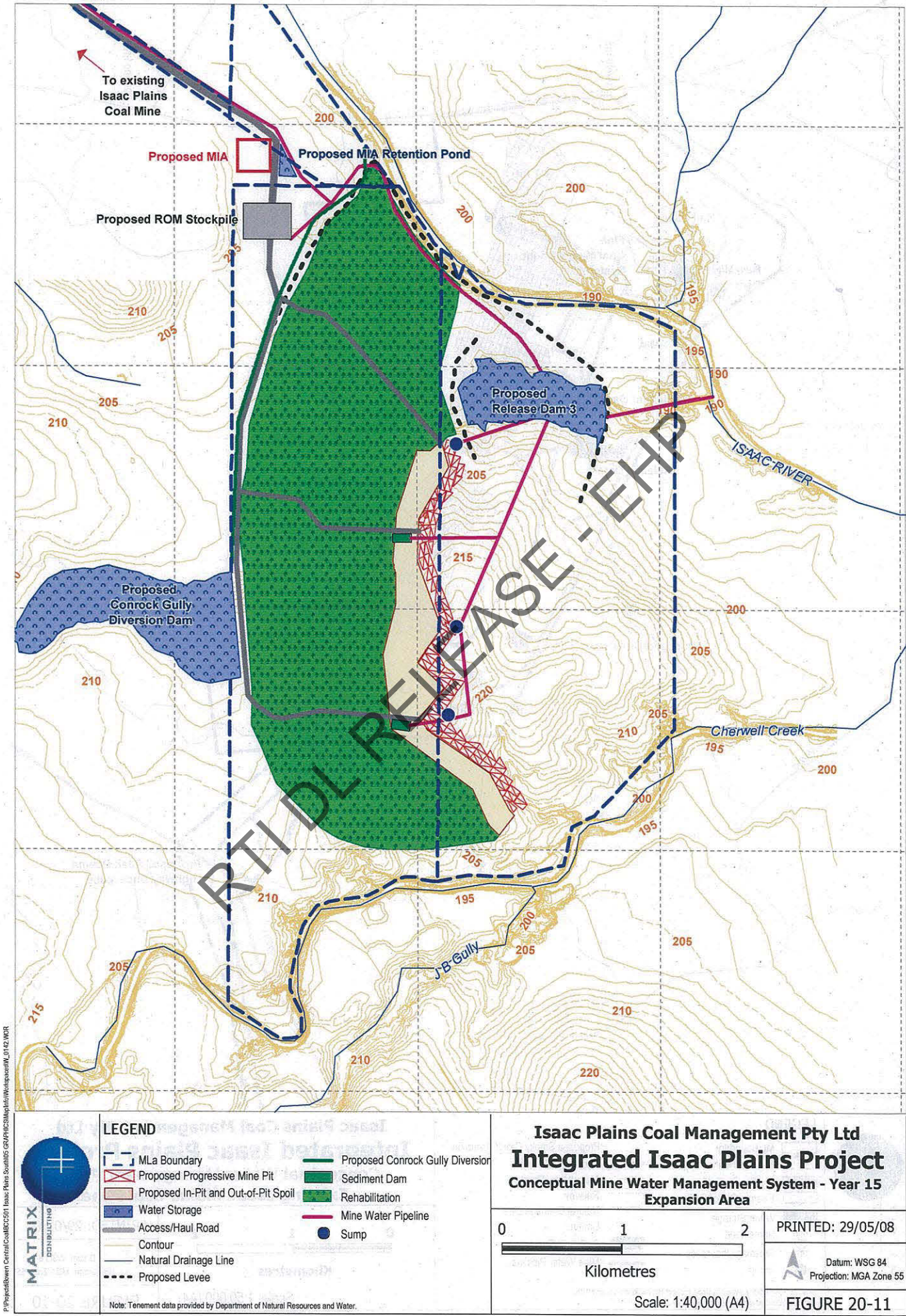
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Target Conductivity (10 % above background)	445
Thus $511Q1 + 7788Q2 = 562Q3$. Solve equation for $Q2:Q1$	
Dilution Ratio	1:130

RTI DL RELEASE - EHP







20.6.3 Groundwater

The IIPP lies within the Central Queensland coalfields. A subartesian aquifer system occurs within the Permian Rangal Coal Measures and provides modest water supplies for agriculture and livestock. Regionally, the Permian subartesian aquifer has poor or patchy water-bearing characteristics.

20.6.3.1 Environmental Values – Existing Isaac Plains Coal Mine

Groundwater in the vicinity of the proposed open cut pits is typically intercepted within 30m below ground surface in Permian sandstone/siltstone units; between approximately 40m and 125m below ground surface in the LHD Coal Seam; and typically beneath the coal seam within Permian lithic sandstone units. Water levels within bores installed within and below the coal seam typically rise to within approximately 30m of the ground surface.

Groundwater is hosted within strata of sandstone, conglomerate, mudstone, shale and coal. Groundwater is also potentially present within unconsolidated sediments such as sand and gravel, present along Smoky Creek and the Isaac River.

Based on the field assessment undertaken in this study, a total of 3 aquifers exist within the region. These include:

- Quaternary Alluvium;
- Tertiary Basalt; and
- Permian Sedimentary Rock and Coal.

Quaternary Alluvium

There are two alluvial deposits in and around the Mine Study area (EPC 755); each near Smoky Creek and the Isaac River respectively. The Quaternary alluvium comprises of clay, silt, sand, gravel, soil and residual deposits. Groundwater use is limited from these deposits and the potential groundwater resource is not known. Extraction rates of approximately 0.5 L/s have been noted by the owner of the bore.

Thin Smoky Creek alluvial deposits cross the northern portion of the Mine Study Area (EPC 755), from north-east to south-west; whilst the Isaac River alluvial deposits cover the southern section of the EPC (south of the proposed Mine Pit area).

Tertiary Basalt

Tertiary basalt crops out near the north-east corner of the EPC 755 boundary and along the eastern boundary near the homestead of Wotonga. This geological unit has a small horizontal coverage across EPC 755, and may host a shallow groundwater system.

Typically, basalt is characterised by a network of cooling fractures that are discontinuous, and the resultant groundwater yield is sporadic. The groundwater resource of the Tertiary basalt unit is not known.

Permian Sedimentary Rock and Coal

The Permian sedimentary rock and coal sequence has the largest regional coverage around the EPC 755 and underlies the alluvium and basalt cover.

The sedimentary rock comprises sandstone, siltstone, mudstone, shale and coal. The sedimentary rock crops out near the centre of the EPC 755 and continues towards the north-east corner. Groundwater extraction from the Permian units is limited, and extraction rates are limited to approximately 0.5 L/s.

Drill hole logs indicate V-notch flow rates range between 0.15 L/sec at 78 m (E7550027R) and 5.0 L/sec at 126 m (E7550050R). In addition, faulted zones may provide additional groundwater flow. Dry drill holes predominately fall within the proposed pit limits. Dry drill holes typically extend to a depth of 50 m and no more than 77 m. These dry holes may reflect the absence of groundwater within the upper sedimentary rock units.



Aquifer Recharge

Recharge of the groundwater system occurs via surface water infiltration into the groundwater system. Recharge to the aquifers in the region occurs predominately in the topographically higher areas and along creek beds during and immediately following rainfall events.

Recharge to the Tertiary basalt aquifer typically occurs in areas of thin soil cover or out crop (typically upland areas) where groundwater can readily move downwards into the aquifer via permeable zones including fractures, joints and vesicles. Recharge also occurs along creek beds, where basalt crops out, and enables direct infiltration of surface water into the aquifer during and following rainfall events.

The Permian sedimentary rock aquifer receives recharge at locations where the unit crops out or subcrops. In addition to this, the aquifer receives recharge via leakage from overlying, adjoining and in some instances, underlying aquifers. Due to the limited availability of hydrogeological data for the area, aquifer recharge rates are not known for the Isaac Plains Mine Site. However, a range between 1-7% of average yearly rainfall is expected for the Moranbah area, based on ranges observed in other areas of Central Queensland.

20.6.3.2 Environmental Values - Expansion Area

Within the Expansion Area, a general 'dryness', i.e. a poor supply, is present that is similar to that experienced in the existing Isaac Plains Coal Mine.

The major geological units in the Expansion Area have been delineated by resource drilling. These are, from shallowest to deepest:

- Tertiary sediment (1-20 m thick) and river alluvium (10-23 m thick);
- Permian Rangel Coal Measures, including:
 - sandstone, siltstone, mudstone, tuff, conglomerate;
 - LHD coal seam (~2.3 m thick); and
 - VER coal seam (5-7 m thick).

Quaternary Alluvium and Tertiary Sediments

The Tertiary sediments are 1-20 m thick (average 8 m) and are mostly unsaturated (i.e. 'dry'). They occur in the hills of the Expansion Area where the terrain is higher. Alluvium occurs along the Isaac River and to a lesser degree along Cherwell Creek. These alluvial sediments comprise a fining-upward sequence of unconsolidated sand, silt, clay, gravel and lithic fragments. The alluvium may extend to a distance up to 750 m from water courses, however, the lateral extent may be highly variable. The river alluvium is likely to have a relatively high permeability and relatively high specific groundwater yield. The particle size of the river alluvium ranges from fine sand to gravel.

Permian Rangel Coal Measures

In the Expansion Area, the Permian-age sedimentary rocks dip to the east (2-6 degrees) and include inter-bedded sandstone, siltstone and lesser amounts of carbonaceous mudstones, coal and tuff.

The Rangel Coal Measures typically have a relatively low permeability and poor water-holding properties (i.e. a relatively low specific yield). A weathered zone extends to 15-30 m below ground level (mBGL). The weathered zone is also considered to have poor water-holding properties.

The Permian Coal Measures contain groundwater within two coal seams: the LHD Seam and the underlying VER. The seams dip to the north-east across the site. Typically, the VER is stratigraphically located approximately 25 m below the LHD. In the north of the Expansion Area the LHD and VER seams 'coalesce' into a single, thicker seam (5-6 m thick). The coal seams are shallowest (approximately 150-175 mAHD) on the western side of Expansion Area and deepest (approximately 45-95 mAHD) at the north-eastern side of the Expansion Area. The Fort Cooper Coal Measures are located immediately beneath the first ply of the VER coal seam.

Sedimentary rocks of the Rangel Coal Measures typically have a low average hydraulic conductivity because of inter-bedding with fine-grained siltstones and mudstones which have very low hydraulic conductivity. Higher hydraulic conductivity sedimentary rock may be encountered within the faulted and fractured zones.



Fault Zones

Faulting is extensive throughout the Expansion Area and is most clearly denoted by changes in coal seam thicknesses and elevations. The regional Isaac Thrust Fault system is a major thrust fault that trends along the Isaac River to the northeast of the proposed pit area near Conrock Gully (JB Mining Services and Hewitt, 2005). Numerous north-north-west trending thrust faults and orthogonal transverse faults occur throughout the Expansion Area. Thrust faults located in the middle to northern section of the Expansion Area have caused throws of up to 25 m. Deeper weathering profiles may be associated with faulted zones within the Permian coal measures. Groundwater yields from the coal measures may also be affected by faulting.

Groundwater Occurrence

Groundwater occurs within the Quaternary alluvium, primarily within prior channels of the Isaac River, and within the Permian coal seams, which are expected to act as the primary conduit of groundwater within the Rangal Coal Measures.

Alluvium

An area towards the north of the Expansion Area contains the thickest section of alluvial sediment. The thickness of alluvium in this area generally ranges between 12 to 20 m. The base of the alluvium in this area generally ranges between 185 to 190 mAHD (although there may be deeper paleo-channels that are not indicated by the available drilling data).

There are limited groundwater level data for the alluvium unit of the Expansion Area. However, records taken from existing monitoring bores indicate an average groundwater level within the alluvial aquifer of approximately 188 m AHD. In this case, the saturated thickness tends to be very shallow averaging 3 m. It is considered that areas of deeper paleo-channel alluvial sediment may contain a more significant saturated thickness.

Owing to the heterogeneous nature of the alluvial aquifers, groundwater level fluctuations will not be uniform or systematic across the aquifer.

Rangal Coal Measures

Based on exploration drilling results, the Rangal Coal Measures located in the Expansion Area contain little or no groundwater similar to that of nearby mines (the existing Isaac Plains Coal Mine (north) and Poirrel Coal Mine (east)). Groundwater is absent in most exploration holes located within the Permian coal measures south of Conrock Gully. Where groundwater was encountered, yields were low. Hence, it is unlikely that coal units within the area south of Conrock Gully will yield significant groundwater during pit excavation.

Drill holes located north of Conrock Gully were also found to be generally dry. An exception to these findings occurred in association with the Isaac Thrust Fault within the coal measures to the north-east of the proposed pit area. As such, it is possible that any faulted-fractured zones intersected by mining operations could potentially yield a greater volume of groundwater. The groundwater modelling of this assessment considers this effect in a 'wet-case scenario'.

The hydraulic conductivity of the coal seams is generally lower than the overlying units. Lateral drainage through the alluvium will occur in preference to vertical drainage to the coal seam. The coal measures are fully saturated (i.e. in a confined state). During mining this confined groundwater is expected to drain into the pits as seepage.

20.6.3.3 Potential Impacts – Existing Isaac Plains Coal Mine

Potential groundwater drawdown around the pit was assessed as part of the approval process in 2005 using the Dupuit Equation. The Dupuit Equation is an analytical method for analysing steady groundwater flow in an unconfined aquifer. Within the mine pit limit, a near-pit decline in groundwater levels of up to 40 m is expected over the 9 year mine life of the existing Isaac Plains Coal Mine. Hydraulic conductivity values and pre-existing regional groundwater contours suggest that the drawdown cone will result in a radius of influence of approximately 2 km from the pit perimeter. The assumption of block averaged hydraulic conductivity, resulting in a conceptually homogenous and isotropic aquifer formation near the pit, gives rise to the anticipated drawdown contours.



Regional impacts are generally expected to be observed to the east and west of the mine site. However, the major thrust fault (Isaac Thrust) located immediately east of the deposit may limit the extent of groundwater drawdown impact in the east. No operational bores are located within two kilometres of the pit, thus it is unlikely that operational bores will be affected by groundwater drawdown associated with the mine development.

Groundwater levels in the area are expected to recover over time once the mining operations cease. Initially, there will be a higher groundwater gradient between surrounding areas and the pit, and this will result in a more rapid flow of groundwater into the pit. As the pit fills post mining through a combination of groundwater seepage and rainfall, this gradient flattens and less groundwater flows into the pit from surrounding areas. Recharge in these surrounding areas begins to take effect and the groundwater levels eventually begin to rise again. Recovery rates will depend on annual rainfall, with drought periods extending the recovery period and wet years shortening the recovery period. Eventually a state of equilibrium will be reached.

Analytical chemistry results indicate that groundwater in each of the major water-bearing systems (Permian sandstone/siltstone, LHD Coal Seam and Permian lithic sandstone) are of similar quality to each other with respect to EC, TDS, pH, metals and major ions. Any mixing between systems induced by mining activities is not likely to result in a decline in the quality of groundwater within an individual aquifer.

A review of groundwater quality data in the area has indicated that groundwater is unsuitable for uses such as stock watering or domestic supply. Rainfall, and any runoff from rehabilitated areas that drain into the final void, will add volumes of water at better quality than groundwater inflows. This dilution will be partly offset by evaporative losses, which will serve to increase the concentrations of salt within the final void water.

20.6.3.4 Potential Impacts - Expansion Area

The Expansion Area will become an open pit mine excavated using dragline and truck-and-shovel to remove the LHD, the underlying VER and their sub-plies. This will result in the removal of the overlying strata and the localised dewatering of aquifers as mining progresses. The depth of the pit will therefore extend to the base of those VER coal seams being mined which is located 30-80 m below ground. Groundwater inflow to the pit void will be collected in sumps constructed on the floor of the pit. The disturbed fill is 'uncompacted' and fractured, resulting in changes in hydraulic conductivity, specific yield and bulk volume.

Potential impacts on groundwater by open cut mining include changes to:

1. water-table levels/potentiometric surface levels;
2. groundwater flow patterns; and
3. bore water-levels and yields.

Groundwater bores within the footprint of the pit will no longer exist.

Additionally, mining activities may also inadvertently change the chemistry of groundwater via induced groundwater mixing and/or surface water mixing. To help estimate mine-induced groundwater flow and drawdown patterns, a numerical model was developed. Impacts on groundwater quality were interpreted qualitatively.

During mining operations, water quality within aquifers surrounding the Expansion Area is expected to remain the same as pre-mining water quality for these aquifers. No change in water quality during mining operations (as compared to pre-mining) is expected for the following reasons:

- during mining operations, groundwater will be continually extracted from the pit to ensure a safe working environment within the pit. Extraction of groundwater from the pit will create a depression in the potentiometric surface at this location, and groundwater surrounding the mine pit will travel towards this depression. The net movement of groundwater towards the pit during mine operation will prevent the movement of potentially poorer quality water (that may have been impacted by mining) from moving away from the mine operation area and into the surrounding aquifers; and



- aquifers outside of the mine pit area will continue to receive recharge via the same processes that occurred pre-mining.

Groundwater quality data also suggests that groundwater in the alluvial aquifer and the Rangal Coal Measures are of similar quality with respect to pH, TDS, major ions and metals. Hence any inadvertent mixing of groundwater (during mining) is unlikely to result in a deterioration of water quality in either aquifer.

During mine operations, water quality within aquifers surrounding the mine pit will continue to be suitable for the same purposes applicable during the pre-mining period.

The main features of the final landform after mining ceases will consist of waste rock dumps to the west, and a final void in the east, south of the ~~202-m AHD contour~~ PMF level. The final void will be approximately ~~3,700~~ 2,750 m long, approximately 7055 m wide (at the base) and have an approximate depth of 80 m.

The final void will collect and accumulate water from groundwater ingress, direct rainfall into the void and from overland surface flows from the slopes of the waste dumps draining into the void. All undisturbed catchment flows will be diverted around the void.

The different hydrogeological parameters of the backfill material combined with the high rate of evaporation within the final void will create a different final equilibrium potentiometric surface than was present prior to mining. This will result in residual drawdown immediately surrounding the mined area when the potentiometric surface reaches an equilibrium level.

Although water quality in the final void is expected to deteriorate over time post-mining, this reduction in water quality is not expected to impact the surrounding aquifers. Water present within the final void (post-mining) will not flow out of the final void and into the regional aquifer for the following reasons:

- high evaporation rates over the final void will result in the final void water level being lower than the potentiometric levels within the surrounding aquifers. Evaporation over the surface of the final void water body causes a permanent sink in the regional potentiometric surface within the vicinity of the final void;
- groundwater will flow under pressure towards the final void along a hydraulic gradient, from areas of high pressure head to areas of low pressure head (i.e. the final void). Accordingly, the permanent depression of the potentiometric surface within the vicinity of the void acts like a sink and will not permit water within the final void to flow outwards into the regional system; and
- the local and regional aquifers will be replenished by rainfall on groundwater recharge zones, and are not expected to change in quality from pre-mining levels.

The long-term final void water level is predicted to be ~~114 (+9) m AHD~~ 156 m or approximately ~~20 (+9)26~~ m deep at its deepest location. TDS modelling predicts that after mine closure the final void water TDS concentration will increase steadily taking approximately 6 years to exceed the ANZECC (2000) stockwater guideline TDS of 2,500 mg/L. Extrapolating further into the future, the model predicts that in approximately 110 years the void water TDS concentration will approach that of seawater (35,000 mg/L).

The mining activities are not expected to have a detrimental impact to the groundwater quality in the vicinity of the Expansion Area. Hence, the post mining groundwater quality within both the alluvium and the Rangal Coal Measures surrounding the mining area are expected to remain the same as pre-mining groundwater quality.

20.6.4 Environmental Protection Objectives and Strategies - Water

Environmental Protection Objectives And Control Strategies - Water	
Environmental Value	Biological and structural integrity of on site and downstream waterways. Maintain groundwater quality and levels throughout the site and surrounding areas.
Environmental Protection Objective	To take all reasonable and practicable measures to avoid degradation of the environmental values of waterways and groundwater aquifers within the vicinity of the IIPP.

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Environmental Protection Objectives And Control Strategies - Water	
Performance Indicators/Criteria	<p>Existing Isaac Plains Coal Mine</p> <p>Water quality downstream, after initial mixing should not exceed 10 % above background water quality: (EC, pH and turbidity) the EA water quality conditions.</p> <p>Expansion Area</p> <p>Water quality downstream after initial mixing should not exceed historical 80th percentile Isaac River concentrations unless upstream water quality is greater than the 80th percentile historical concentration. Under these conditions, the water quality downstream should not exceed the upstream water quality concentrations the EA water conditions.</p> <p>Treated Sewerage Effluent:</p> <ul style="list-style-type: none"> • BOD 5 mg/L; • Suspended Solids 30 mg/L; • pH 6.5 – 8.5; • Free Residual Chlorine 1 mg/L; and • Faecal Coliforms 1000 thermotolerant coliforms/100mL. <p>Where required, water sampling to be undertaken in accordance with Water Quality Sampling Manual, EPA (3rd edition, 1999).</p> <p>Laboratory analyses to be undertaken by a NATA-accredited laboratory.</p>
Control Strategies/Commitments	<p>General</p> <p>All runoff water from disturbed areas will be captured and managed on site within the surface water management system.</p> <p>Implementation of a Mine Water Management System that achieves the following functions:</p> <ul style="list-style-type: none"> • diversion of clean water from undisturbed areas away from disturbed areas; • directing rainfall run-off from all disturbed areas and sediment dams for settlement of suspended solids; • directing all pit area water to the release dams RD1, RD2 and RD3; • managing controlled releases from release dams to surface waters to achieve recommended performance criteria. Site specific background water quality will be collected following an overflow event; and • re-use of collected water as part of operations (e.g. dust suppressant on roads, vehicle washdown). <p>Infrastructure at the existing Isaac Plains Coal Mine managed as follows to prevent the release of contaminants to the environment:</p> <ul style="list-style-type: none"> • workshop housed on a cement pad with an oil/water separator; • chemical storage within the workshop is bunded in accordance with AS1940⁷; • portable lubrication system is self bunded; • two waste oil tanks are bunded in accordance with AS1940; • process diesel fuel tank (capacity 26,000 L) bunded in accordance with AS1940; • diesel fuel tanks (capacity 32,000 L) bunded in accordance with AS1940; • fuel storage - 2 x 58,000 litre diesel self-bunded fuel tanks – bunded in accordance with AS1940; • fuelling station – cement pad complete with bunding, sump and oil water separator. (Truck refuelling is via service trucks at various locations around the site – spill kits are located on refuelling vehicles); • light and heavy vehicle washdown pad which includes sediment control, oil/water separator and adequate bunding; • a septic system with a transpiration trench at the main administration offices with capacity for 20 equivalent persons (EP); • a septic system with a transpiration trench at the train load-out with capacity for 5 EP; • fuelling station – cement pad complete with bunding, sump and oil water separator. (Truck refuelling is via service trucks at various locations around the site); • MIBC (Methylisobutylcarbinol) tank (capacity 26,000 L) bunded in accordance with AS1940; and • flocculent storage silo, stored next to MIBC tanks and process diesel tanks bunded in accordance with AS1940. <p>Infrastructure within the Expansion Area managed as follows to prevent the release of contaminants to the environment:</p>

⁷ AS 1940 - Storage and Handling of Flammable and Combustible Liquids of 2004.



Environmental Protection Objectives And Control Strategies - Water

- workshop – housed on a cement pad and oil/water separator;
- chemical storage within the workshop bunded in accordance with AS1940;
- portable lubrication system is self bunded;
- diesel fuel tanks – 2 x 58,000 L self-bunded storage tanks in accordance with AS1940;
- fuelling station – cement pad complete with bunding, sump and oil water separator. (Truck refuelling will be via service trucks at various locations around the site);
- light and heavy vehicle washdown pad which includes sediment control, oil water separator and adequate bunding; and
- a septic system at the main office/mine infrastructure area with capacity for 60 EP. As with the system at the existing Isaac Plains Coal Mine, this system will be installed *in lieu* of a package sewage treatment plant. The treated sewage from this system will be pumped out to the workshop dam on a regular basis.

The mine pits will be dewatered with water pumped out and stored in the release dams.

Runoff from spoil dumps will be directed to sediment dams. This water will then be directed to the release dams until such time as the spoil dumps are sufficiently rehabilitated.

Prediction of residual void water quality will be assessed prior to site decommissioning and rehabilitation.

If water monitoring detects acidic conditions in water storages, then lime dosing can be undertaken as required for neutralisation.

Expansion Area controlled release rules:

- all pumping from the open pits, MIA Retention pond and sediment dams to Release Dam 3 will cease when the available flood storage below the spillway crest level falls below the 10 % AEP 24-hour duration storm volume (minus losses). For the first year, the 10 % AEP 24-hour duration storm volume is 400 ML. (However, the minimum flood storage volume will reduce as the dam catchment becomes mined);
- no controlled releases will be made when the stored volume in Release Dam 3 is less than 500 ML;
- no releases will be made when the Isaac River flow is less than 1,000 ML/day and a median EC of 180 $\mu\text{S}/\text{cm}$;
- a maximum release of 30 ML/day will be made from Release Dam 3 to ensure the combined Isaac River and release water quality at WQ5 downstream of the mine does not exceed the adopted water quality compliance criteria presented in the table below;
- when the water quality in the Isaac River at WQ5 upstream of the Expansion Area exceeds the adopted water quality compliance criteria for pH, EC and Total Suspended Solids (TSS) outline below, the quality of water released from the Expansion Area must not exceed the quality of water in the Isaac River at WQ5; and
- Release Dam 3 water quality releases will be limited to a pH of 6 to 9 and a maximum EC of 5,000 $\mu\text{S}/\text{cm}$.

Controlled releases from the expansion area will be in accordance with the relevant EA conditions.

The release points, RP1 and RP2 and water quality sites WQ5 and WQ6 will be monitored for flow and quality during a release event to ensure the water quality compliance criteria area achieved. Details of the operational rules of the dams will be determined once the pipe outlet configuration has been designed and presented as part of the Plan of Operations for IIPP.

If the stored water collected in the MIA Retention Pond meets the water quality compliance criteria, i.e. a pH of 6 to 9 and a maximum EC of 5,000 $\mu\text{S}/\text{cm}$, and flow is recorded at WQ5 upstream of the mine, the MIA Retention Pond water will be released to the Isaac River. When there is no Isaac River flow recorded at WQ5, the water will be pumped to Release Dam 3.

	pH	EC ($\mu\text{S}/\text{cm}$)	TSS (mg/L)
80 th percentile Concentration (Isaac River)	7.8	320	3,722.5

Diversions

Development of stable diversion channels for Conrock Gully and Smoky Creek to ensure there is no increase in sediment load discharged to the Isaac River from the diversions. Detailed design plans will be prepared and included in the Plan of Operations prior to undertaking the works.

The chosen option for the Conrock Gully Diversion has been selected as the optimal balance of excavation requirements and height of the diversion dam spillway (and hence impoundment area). To minimise the impoundment area and subsequent loss of flows through evaporation requires a deeper diversion channel. Hence while the channel will be designed using natural channel principals, the diversion channel will be longer with a flatter bed shape.

The detailed design plans will also be submitted in support of obtaining approvals for the Smoky Creek Diversion under the *Water Act 2000*. (Conrock Gully is not a defined watercourse).

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Environmental Protection Objectives And Control Strategies - Water

Detailed design plans of the Conrock Gully dam and diversion will be prepared and included in the relevant PoO for the time period in which IPCM propose to undertake the works.

Low Level Crossing

The crossing will be designed to allow coal to be hauled from the Expansion Area to the existing Isaac Plains Coal Mine primarily haul trucks. The crossing is proposed to be an over topping low level crossing accommodating only low flow events of less than a 1 in 2 year occurrence interval. The crossing will also allow for the dragline to be 'walked' across the Isaac River on completion of mining the existing Isaac Plains Coal Mine, nominally in the year 2016. This will require the Isaac River crossing to be widened by adding bed sand or gabions to increase the width. The additional material will be removed once the dragline has crossed. These provisions will be confirmed with the EPA and DNRW prior to moving the dragline.

Construct low level cross of the Isaac River at or just above bed level to minimise obstruction to flow and to allow sediment to pass over during both high and low flow events.

Impose speed limits on the low level crossing of the Isaac River to minimise the spillage of coal. Conduct weekly inspections for spillage of coal and collect any spillages accordingly.

Minimise obstruction to streamflow when conducting widening works for walking the dragline across the Isaac River. Obtain Water Act and Plan of Operations approval prior to undertaking the works and prepare detailed plans in support of obtaining the necessary approvals.

Provisions are to be made for the safe movement of fauna in the vicinity of the low level crossing of the Isaac River. This includes the provision of 'dry culverts' or pipe/box culvert structures, and/or the erection of fencing along the margin of the riparian corridor in the vicinity of the crossing to direct fauna into the safe passage area and prevent fauna crossing the road. As part of the detailed design of the low level crossing, flood studies will be assessed to ensure that appropriate fauna passageways are provided.

Surface Water Monitoring

Surface water monitoring will be conducted at the Expansion Area in accordance with the following as outlined in the table below at the locations illustrated in **Figure 20-12** and **Figure 20-13**.

Surface Water Quality Monitoring

Location	Parameters	Frequency
Existing Isaac Plains Coal Mine		
<u>Release Dam 1 discharge point</u>	pH, Turbidity, EC	Daily during discharge
	for parameters in Schedule C - Table 2 (End of pipe contaminant release limits) in EA	Once on first discharge and weekly thereafter until discharge has ceased
<u>Release Dam 2 discharge point</u>	pH, Turbidity, EC	Daily during discharge
	for parameters in Schedule C - Table 2 (End of pipe contaminant release limits) in EA	Once on first discharge and weekly thereafter until discharge has ceased
W1	pH, Turbidity, EC	Daily during discharge
	For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Once on first discharge and weekly thereafter until discharge has ceased
W2	pH, Turbidity, EC	Daily during discharge
	For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Once on first discharge and weekly thereafter until discharge has ceased
W3	pH, Turbidity, EC	Daily during discharge
	For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Once on first discharge and weekly thereafter until discharge has ceased
W4	pH, Turbidity, EC	Daily during discharge
	For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Once on first discharge and weekly thereafter until discharge has ceased

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Environmental Protection Objectives And Control Strategies - Water			
	Treated effluent storage pond	5-day BOD Suspended Solids Total Phosphorous Total Nitrogen Thermotolerant coliforms/100mL pH	Monthly
Expansion Area			
	RP1MS1	pH, Turbidity, ECpH, EC and TSS for parameters in Schedule C - Table 2 (End of pipe contaminant release limits) in EA	Daily during discharge. Once daily during discharge events Once on first discharge and weekly thereafter until discharge has ceased
	RP2MS2	pH, Turbidity, ECpH, EC and TSS for parameters in Schedule C - Table 2 (End of pipe contaminant release limits) in EA	Daily during discharge. Prior to release to the Isaac River Once on first discharge and weekly thereafter until discharge has ceased
	Upstream of the Expansion Area (ES1)	Flow Rate and EC	Continuous
	Upstream and Downstream of the Expansion Area on both Isaac River and Cherwell Creek (WQ5, and WQ6, WQ7 and WQ8)	pH, Turbidity, ECpH, EC and/or Total Dissolved Solids, Turbidity, Total Suspended Solids, Metals, Anions and Cations For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Daily during discharge Event-Based (grab samples) Once on first discharge and weekly thereafter until discharge has ceased
	WQ6	pH, Turbidity, EC For parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency) in EA	Daily during discharge Once on first discharge and weekly thereafter until discharge has ceased
	On-site Water Storages (MS1, MS2, MS3 and MS4)	Water levels, pH, EC and/or Total Dissolved Solids, Turbidity, Total Suspended Solids, Metals, Anions and Cations	Monthly until baseline is established and then quarterly and during releases
	MS1 only	As, Co, Fe, Se, Sb and Zn	Monthly
	In pit (Expansion Area)	pH	Monthly
Groundwater			
In the event that groundwater fluctuations in excess of 2 m/yr are detected and the fluctuations are not the result of pumping from licensed bores are 25% greater than EIS predictions then, the EPA must be notified within 14-7 days.			
Location	Parameters	Frequency	
Existing Isaac Plains Coal Mine			
Burton Coal Bore 2	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months	
Swamp Bore 1	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months Quarterly	
DNR 13060284	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months	

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Environmental Protection Objectives And Control Strategies - Water

Expansion Area		
Near Field 1	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA Water-levels EC	Every 6 months Water-levels will be monitored continuously for a period of 12 months and then every six months Every six months
Near Field 2	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA Water-levels EC	Every 6 months Every three months for a period of 12 months and then every six months Every six months
Near Field 3 and 4 and 584s, 584d, 593 and 594	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA Water-levels pH, EC and TDS, major cations and major anions, total nitrogen, ammonia, total phosphorous and reactive phosphorous, Al, As, Cd, Cu, Pb, Hg, Se and Zn	Every 6 months Every three months for a period of 12 months and then every six months Every six months
Near Field 4	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months
584d	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months
594	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months
Regional 1, 2, 3 and 4	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA Water-levels Regional 2 and 4 only - pH, EC and TDS, major cations and major anions, total nitrogen, ammonia, total phosphorous and reactive phosphorous, Al, As, Cd, Cu, Pb, Hg, Se and Zn	Every 6 months Monthly Annually
Regional 3	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA	Every 6 months
*Stock Watering Bores 12 and 20	Water-levels	Every three months for a period of 12 months and then annually
*Stock Watering Bore 18	For parameters in Schedule C - Table 14 (Groundwater investigation trigger levels) in EA Water-levels, abstraction rates, EC	Every 6 months Every three months for a period of 12 months and then annually
<p>Groundwater level fluctuation and water chemistry monitoring will be undertaken in groundwater bores surrounding the mining operations. The proposed operational phase groundwater monitoring program is outlined below at the locations illustrated in Figure 20-13 and Figure 20-14.</p> <p>*After the initial monitoring period, any stock water bores believed to be unreliable due to poor construction, age, corrosion and other factors may be removed from the monitoring program.</p>		



20.6.5 Flood Protection Levees

20.6.5.1 Levee Construction Material

The alignments and typical cross sections of the Q500 and PMF levees are illustrated in **Figure 20-15**. The Q500 levee is approximately 8.3 km long and has a constructed volume of 325,000 m³. The PMF levee is approximately 8.9 km long and has an additional volume of 1.6 Mm³ (in addition to the initial Q500 levee volume).

There is approximately 260 Mm³ of overburden available from the Expansion project. Based on logs from the exploration drill holes there is estimated to be approximately 25 Mm³ of clay overburden material that is likely to be suitable for levee construction. This material is located near the surface over the entire mining excavation area. The top of the clay layer varies from the surface down to a depth of approximately 10 m. The clay layer has a thickness ranging from 1 m to 10 m.

Based on these quantities suitable clay will be available near the surface at the commencement of operations to construct the Q500 levee. Mine planning and overburden dump scheduling will be conducted to ensure that suitable additional volumes of clay material are available and accessible in the final spoil dump for the construction of the PMF levee at mine closure.

Geochemical characterisation of clay spoil indicates that this material ranges from slightly to moderately sodic (**Appendix J**). Soil testing of potential levee construction material will be conducted to avoid the use of any highly sodic material in levee construction. If necessary, dependant on the test results, any sodic material used in levee construction will be treated with soil conditioner, such as dolomite, to restore the ionic balance. Constructed levees will also be topsoiled and grassed to minimise the potential for erosion of any sodic material.

20.6.5.2 Levee Stability

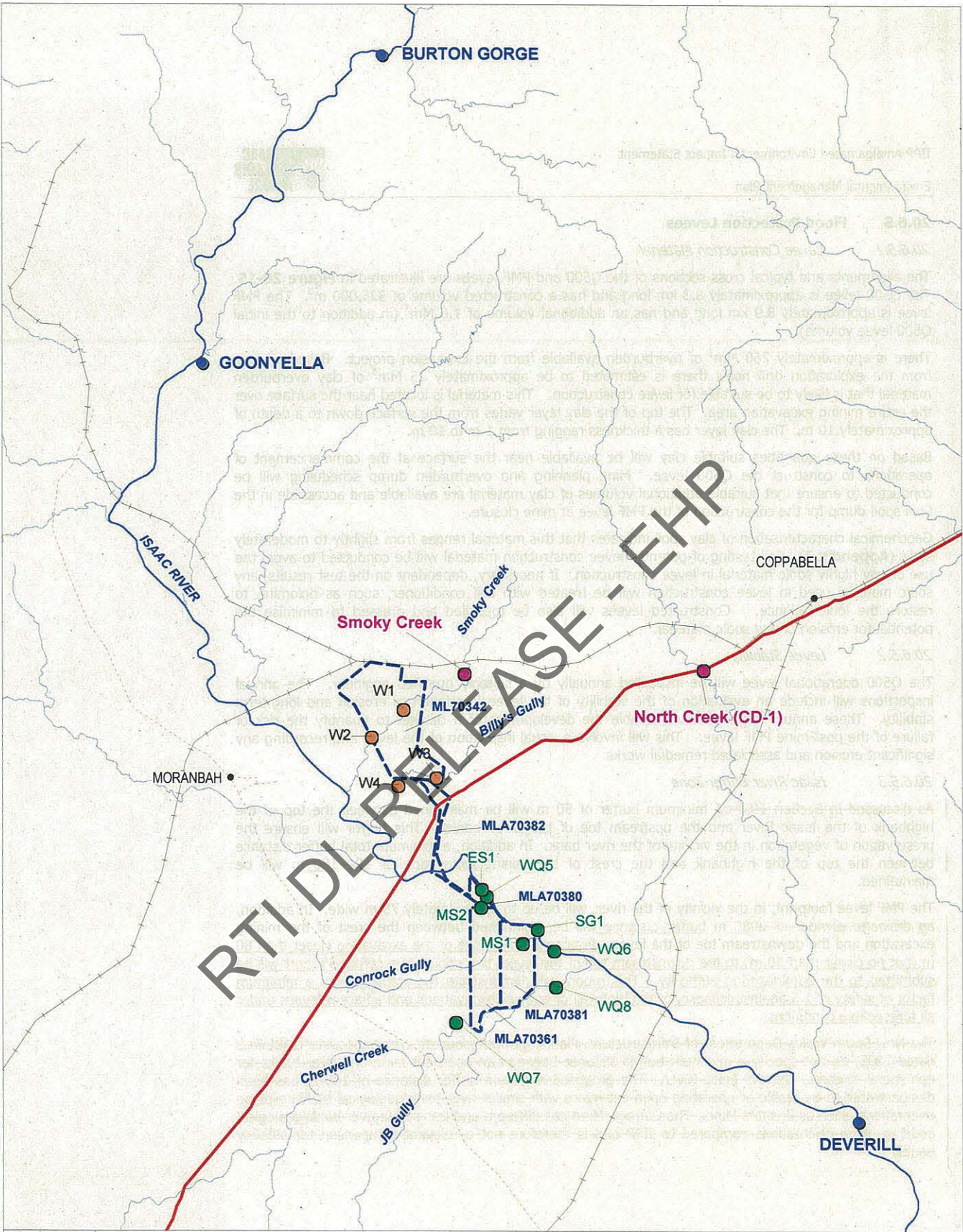
The Q500 operational levee will be inspected annually by a suitably qualified engineer. The annual inspections will include an evaluation of the stability of the levee in relation to erosion and long-term stability. These annual inspections will enable the development of a dataset to quantify the risk of failure of the post-mine PMF levee. This will involve a visual inspection of the levee and recording any significant erosion and associated remedial works.

20.6.5.3 Isaac River Buffer Zone

~~As discussed in Section 10.8 aA~~ minimum buffer of 50 m will be maintained between the top of the highbank of the Isaac River and the upstream toe of the levee banks. This buffer will ensure the preservation of vegetation in the vicinity of the river bank. In addition, a minimum total buffer distance between the top of the highbank and the crest of the mining excavation of ~~100-150~~ m will be maintained.

The PMF levee footprint, in the vicinity of the river, will be up to approximately 75 m wide. In addition, ~~an drainage corridor of 2080 m buffer distance~~ will be maintained between the crest of the mining excavation and the downstream toe of the levee. ~~Prior to any advance of the excavation closer than 80 m (but no closer than 30 m) to the downstream toe of the levee, two copies of a certified report will be submitted to the administering authority. This report will 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.~~

~~The New South Wales Department of Infrastructure, Planning and Resources' Stream/Aquifer Guidelines dated 2005, do not specify a minimum buffer distance between an open cut mine and river banks for ephemeral streams, like the Isaac River. The proposed minimum buffer distance of 100 m has been demonstrated to be stable at operating open cut mines with similar river bank/geological bedding plane orientations, such as Ensham Mine. The Curragh Mine has different and less stable river bank/geological bedding plane orientations compared to IIPP and is therefore not a relevant comparison for stability issues.~~

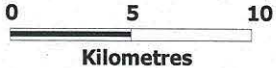


LEGEND

- Town
- Major/Minor Road
- Railway Line
- Natural Drainage Line
- MLA and ML Boundary
- Water Gauging Station
- Existing Water Monitoring Site
- Proposed Water Monitoring Site
- Broadlea Monitoring Sites

Data sourced from (c) Commonwealth of Australia (Geoscience Australia) 2002

Isaac Plains Coal Management Pty Ltd
Integrated Isaac Plains Project
Water Gauging Stations and Monitoring Sites

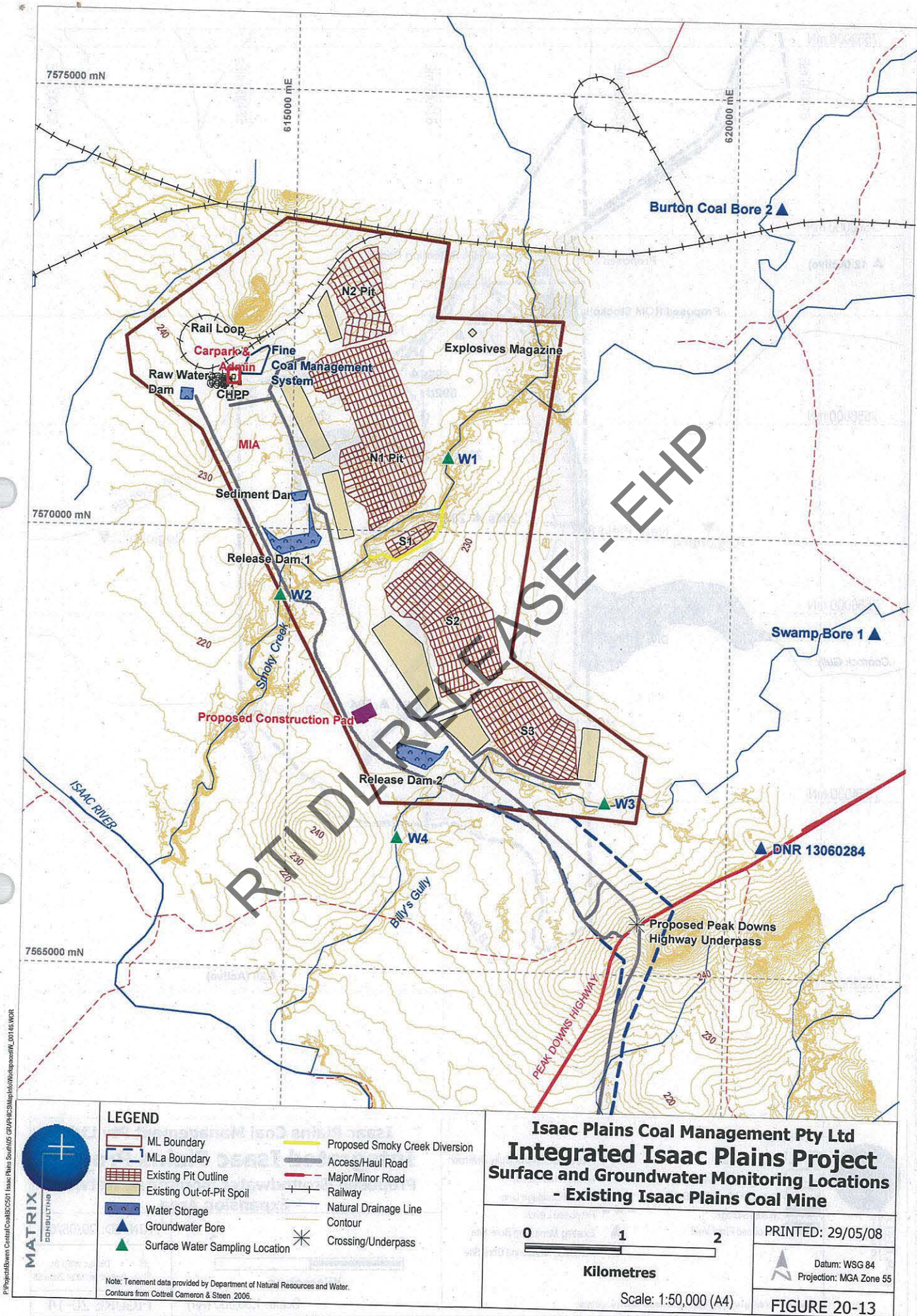


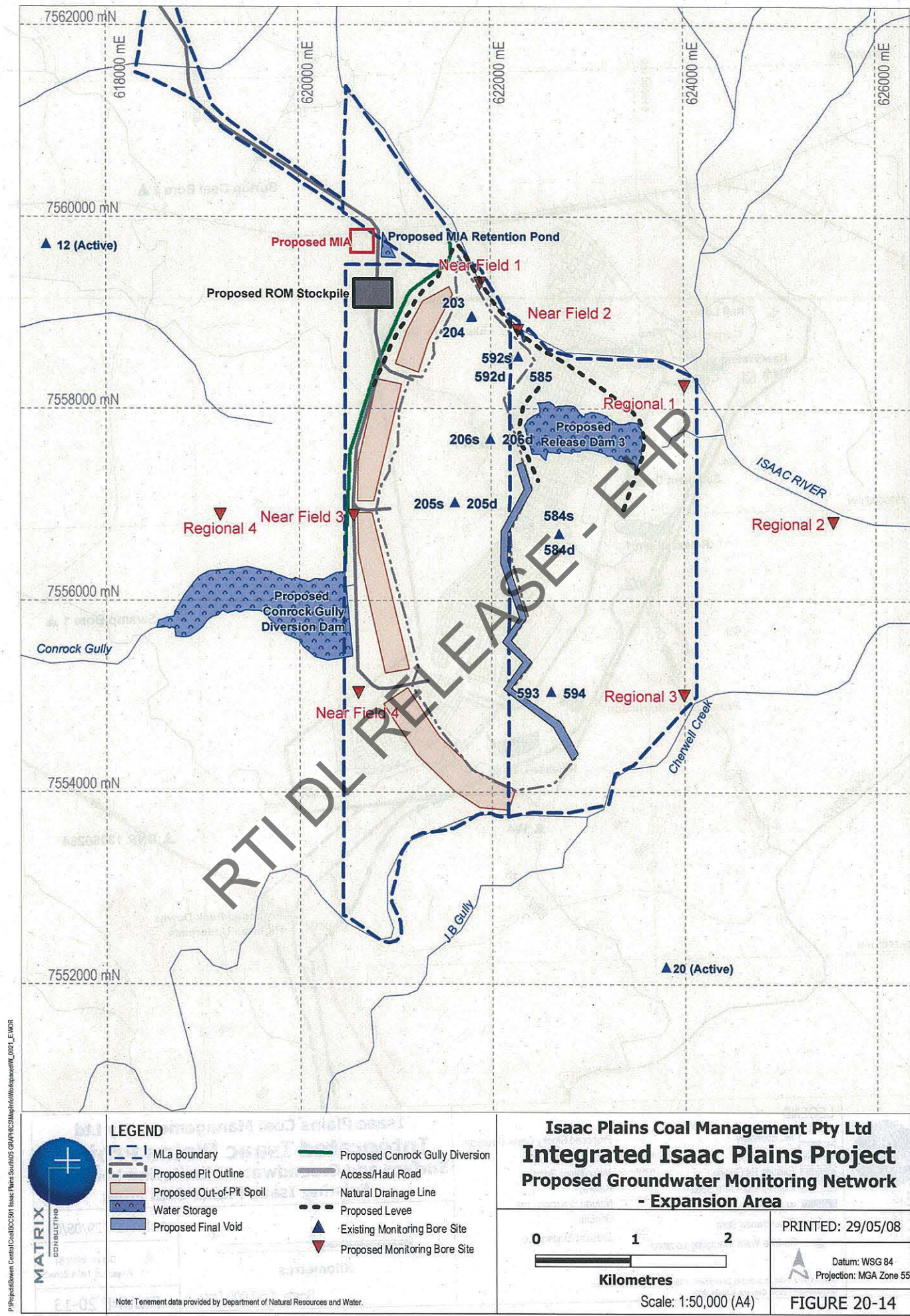
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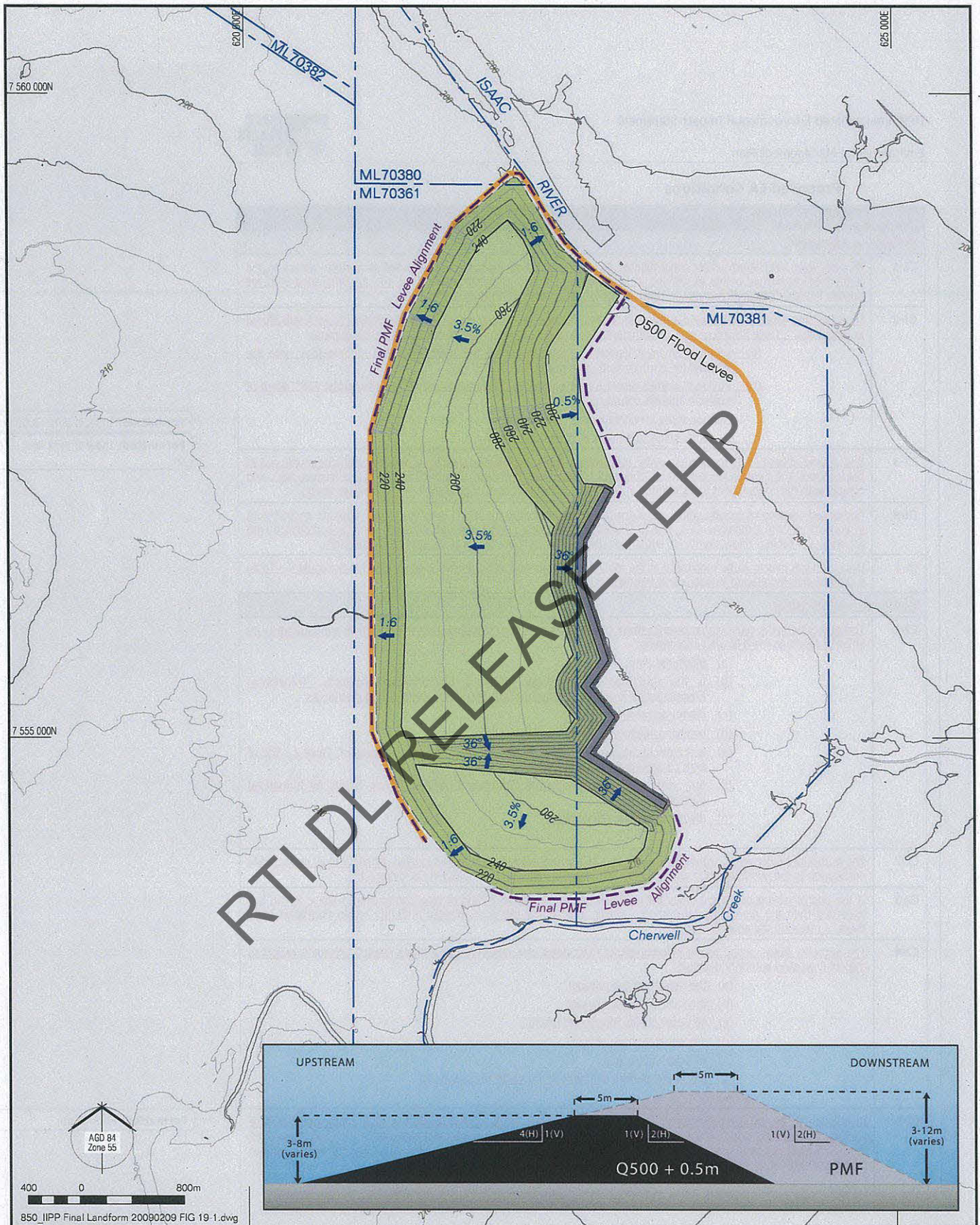
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FIGURE 20-12







LEGEND

- ML Boundaries
- Surface Contours (5m interval)
- PMF Final Levee Alignment
- Proposed Final Void
- Rehabilitated Spoil
- Q500 Levee Alignment



INTEGRATED ISAAC PLAINS PROJECT
Isaac Plains
Flood Protection Levees

FIGURE 20-15

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Environmental Management Plan



Proposed EA Conditions

Proposed EA Conditions

Authorised Releases

C1-1	Process water and storm water contaminated by mining activities must only be released to surface waters at the authorised discharge points as defined in Schedule C - Table 1 (Discharge locations) and in compliance with the release limits defined in Schedule C - Table 2 (End of pipe contaminant release limits).
C1-2	If end of pipe water quality during authorised release flow events exceed any of the contaminant trigger levels stated in Schedule C - Table 3 (End of pipe contaminant trigger levels), the environmental authority holder must: <ul style="list-style-type: none"> (a) complete an investigation in accordance with the ANZECC (2000) methodology, into the potential for environmental harm; and (b) provide a written report to the administering authority within twenty-eight (28) days of receiving analysis results, outlining: <ul style="list-style-type: none"> i) details of the investigations carried out; and ii) actions taken to prevent environmental harm.
C1-3	End of pipe release limits for process water and storm water contaminated by mining activities must be monitored at the locations and frequencies defined in Schedule C - Table 4 (End of pipe monitoring locations and frequencies), and comply with the contaminant limits defined in Schedule C - Table 2 (End of pipe contaminant release limits).
C1-4	Authorised releases of process water and storm water contaminated by mining activities to the receiving environment in accordance with conditions C1-1 and C1-2 shall be only during periods of natural flow events in compliance with Schedule C - Table 5 (Flow events for authorised discharge) upstream of the associated discharge point.
C1-5	Discharge volumes must be monitored at the monitoring points and at the frequencies specified in Schedule C - Table 4 (End of pipe monitoring locations and frequencies).

Notification of Discharge

C2-1	The authority holder must within twenty-four (24) hours prior to a discharge notify the administering authority by email or facsimile the following information: <ul style="list-style-type: none"> (a) discharge date; (b) is the discharge in accordance with the Environmental Authority, Transitional Environmental Program, Emergency Direction or an unauthorised discharge; (c) discharge point/s; (d) receiving water/s; (e) is the discharge quality limits in accordance with EA limits (Schedule C Table 2 - End of pipe contaminant release limits); (f) flow volume of natural waterway (Schedule C Table 5 - Flow events for authorised discharge); and (g) discharge volume (estimated).
C2-2	The authority holder must, within twenty-four (24) hours after discharge has ceased, provide email or facsimile notification to the administering authority including updated information required in Condition C1-6.
C2-3	If the end of pipe contaminant limits defined in Schedule C - Table 2 (End of pipe contaminant release limits) are exceeded then the environmental authority holder must notify the administering authority within fourteen (14) days of receiving the analysis results.
C2-4	The authority holder must, within twenty-eight (28) days of receiving the analysis results, provide a report to the administering authority detailing: <ul style="list-style-type: none"> (a) the reason for the release; (b) the location of the release; (c) all water quality monitoring results; (d) any general observations; (e) all calculations; and (f) any other matters pertinent to the water release event.
C2-5	In addition to the quality characteristic limits specified in Schedule C - Table 2 (End of pipe contaminant release limits), process water and storm water contaminated by mining activities released in accordance with conditions C1-1 thru C1-5 must not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.

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Proposed EA Conditions	
Receiving waters	
C3-1	Waters must be monitored during discharge events at the locations and frequencies defined in Schedule C - Table 6 (Receiving water monitoring locations and frequency) and for the parameters specified in Schedule C - Table 7 (Receiving water contaminant limits) and Schedule C - Table 8 (Receiving water condition indicator and monitoring frequency) and Schedule C - Table 9 (Receiving water contaminant trigger levels).
C3-2	Monitoring results from sampling at the locations defined in Schedule C - Table 6 (Receiving water monitoring locations and frequency) must comply with the contaminant limits defined in Schedule C - Table 7 (Receiving water contaminant limits).
C3-34	<p>If water quality of the receiving waters during authorised release flow events exceed any of the contaminant trigger levels stated in Schedule C - Table 9 (Receiving water contaminant trigger levels), the environmental authority holder must:</p> <ul style="list-style-type: none"> (a) complete an investigation in accordance with the ANZECC (2000) methodology into the potential for environmental harm; and (b) provide a written report to the administering authority within twenty-eight (28) days of receiving analysis results, outlining: <ul style="list-style-type: none"> i) details of the investigations carried out; and ii) actions taken to prevent environmental harm.
Water Monitoring	
C4-1	<p>The following information must be recorded in relation to all water sampling required under Agency Interest: Water –</p> <ul style="list-style-type: none"> (a) the date on which the sample was taken; (b) the time at which the sample was taken; (c) the monitoring point at which the sample was taken; (d) the measured or estimated upstream daily flow volume at the time of sampling; and (e) the results of all monitoring.
C4-2	The method of water sampling required by this environmental authority must comply with that set out in the current edition of the Environmental Protection Agency's Water Quality Sampling Manual.
Non-Discharge Water Quality Monitoring	
C5-1	The authority holder must collect water quality samples in accordance with Schedule C - Table 10 (Non-Discharge Water Quality Monitoring and Frequency) during natural flow events, when the authority holder is not discharging, from locations specified in Schedule C - Table 6 (Receiving water monitoring locations and frequency). The monitoring data must be submitted annually with the annual return.
Water and stormwater Management	

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Environmental Management Plan



C7-1	<p>A water management, erosion and sediment control plan must be prepared and implemented prior to commencement of mining activities in the expansion area and must include a site water balance indicating sources and quality of water for mining activity use, contact testing of relevant overburden, ore and waste material from the site, as well as identifying methods to:</p> <ul style="list-style-type: none"> (a) determine the adequacy of the system to prevent unauthorised discharges during Average Recurrence Interval (ARI) 1 in 25, 1 in 50, 1 in 100, 1 in 200, and 1 in 1000 year rainfall events considering both an operational water balance and the ability to deal with rainfall events that may occur on site at any time; (b) undertake the application of 'time of concentration' design rainfall events for catchments contributing to individual relevant dams or storages or to groups of dams or storages, under conditions arising from water balance modelling or more conservative alternatives; so as to determine the failure outcomes for worst case contaminant release including overtopping and likely collapse of structures and the Annual Exceedence Probability (AEP) levels at which such outcomes occur; (c) develop and implement control measures for routine operations to minimise the likelihood of environmental harm; (d) manage seepage and drainage for all hazardous or regulated dams and storages on site; (e) undertake erosion control mitigation measures for the site for areas that drain or lead directly to receiving waters; (f) prevent contamination of stormwater and manage on-site overland water flows; (g) develop and implement contingency plans and emergency procedures for non-routine situations; (h) develop and implement a system for emergency spills or discharges; (i) manage off site water releases and minimise sediments and salinity releases; (j) incorporate a risk management approach to how changing levels of floods, drought and water quality risks should be addressed; (k) minimise the potential for soil and spoil erosion, soil contamination and acid rock drainage, particularly with regard to first flush flows following rainfall events; (l) review and monitor the water management system, hydrological processes performance indicators and sediment retention pond capacities to ensure the release limits defined in Agency Interest: Water are met; and (m) develop and implement an annual review of environmental performance and continual improvement.
Temporary Interference with waterways	
C9-1	<p>Temporary destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Water Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.</p>

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Proposed EA Conditions	
Groundwater	
C10-1	Groundwater affected by the mining activities must be monitored at the locations shown in Attachment 1 – Figures 3 and 4 and at the locations and frequencies specified in Schedule C - Table 13 (Groundwater monitoring locations and frequency), and be carried out in accordance with the latest edition of the EPA Water Quality Sampling Manual.
C10-2	If the groundwater investigation trigger levels defined in Schedule C - Table 14 (Groundwater investigation trigger levels) are exceeded then the environmental authority holder must complete an investigation into the potential for environmental harm and notify the administering authority with twenty-eight (28) days of receiving the analysis results.
C10-3	Groundwater levels and groundwater drawdown fluctuations more than 25% greater than the EIS predictions, not resulting from the pumping of licensed bores, must be notified within seven (7) days to the administering authority following completion of monitoring.
C10-4	The groundwater monitoring data must be reviewed on an annual basis. The review must include the assessment of groundwater levels and quality data, and the suitability of the monitoring network. The assessment must be submitted to the administering authority within twenty-eight (28) days of receiving annual groundwater data.
C10-5	The following information must be recorded in relation to all groundwater water sampling: (a) the date on which the sample was taken; (b) the time at which the sample was taken; (c) the monitoring point at which the sample was taken; and (d) the results of all monitoring.
Isaac River Buffer Zone	
C11-1	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 80m from the downstream toe of the Q500 levee 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.
C11-2	Prior to any advance of the excavation closer than 80m to the downstream toe of the Q500 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 Q500 flood event in the Isaac River. This certified report will be treated as a design plan which is 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.
C11-3	Where, on the basis of a satisfactory geotechnical report, open-cut mining advances closer than 80m to the downstream toe of the Q500 levee, the excavations for mining must at all times and unconditionally leave a buffer distance of at least 30m between the downstream toe of the Q500 levee and the highwall or endwall edge of the mine excavation.
C11-4	The highwall or endwall edge of the mine excavation adjacent to, or parallel to, the Isaac River must at all times and unconditionally be at least 150m from the high bank of the Isaac River.
C11-5	During mining operations the minimum 30m buffer between the downstream toe of the Q500 levee and the highwall or endwall edge of the mine excavation must be monitored for signs of surface cracking. Any cracking or signs of highwall or endwall collapse must be reported to the administering authority within 24 hours.
Sewage effluent	
C12-1	All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in Schedule C - Table 15 (Sewage treatment effluent quality targets for dust suppression and irrigation).
C12-2	Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in Schedule C - Table 15 (Sewage treatment effluent quality targets for dust suppression and irrigation).
C12-3	Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any sensitive or commercial place.

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Environmental Management Plan



C12-4	Subject to Conditions (C12-1) to (C12-3) inclusive, sewage effluent from sewage treatment facilities must be reused or evaporated and must not be directly released from the sewage treatment plant to any waters or the bed and banks of any waters.
C12-5	The effluent irrigation areas must have a separation distance of at least 30 meters from any groundwater bores and surface waters.
C12-6	The irrigation of treated effluent must be carried out in a manner such that: <ul style="list-style-type: none"> (a) vegetation is not damaged; (b) soil erosion and soil structure damage is avoided; (c) there is no surface ponding of treated effluent; (d) percolation of treated effluent beyond the plant root zone is minimised; (e) the capacity of the land to assimilate nitrogen, phosphorus, salts, water and organic matter (as measured by oxygen demand) is not exceeded; and (f) the quality of groundwater is not adversely affected.
C12-7	Notices must be prominently displayed on any treated effluent irrigation area warning staff and the public that the area is irrigated with treated effluent and not to use or drink the treated effluent. These notices must be maintained in a visible and legible condition.
C12-8	The daily volume of contaminants released to land must be determined by an appropriate method, for example a flow meter, and records kept of such determinations.
All dams	
H1-1	The holder of this environmental authority must ensure that dams are designed, constructed, operated and maintained in accordance with accepted engineering standards and are fit for the purpose for which they are intended.
H1-2	The hazard category of each dam must be assessed by a suitably qualified and experienced person at least once per year, based on documented evidence sufficient to define or confirm the current nature and extent of environmental consequences for potential failure of that dam. Hazard category is to be determined in accordance with the Department of Mines and Energy's Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.
H1-3	The hazard category of dams constructed prior to grant of this environmental authority, must be assessed by a suitably qualified and experienced person within six months of this environmental authority taking effect, and not less frequently than on an annual basis.
H1-4	Dams having a hazard category assessed as significant or high must be specifically authorised by an environmental authority.
H1-5	The condition of dams must be monitored for early signs of loss of structural or hydraulic integrity, based on the advice of a suitably qualified and experienced person. The methods of monitoring and frequency of monitoring shall be as assessed by that suitably qualified and experienced person, based on the hazard category and particular circumstances of each dam.
H1-6	In the event of early signs of loss of structural or hydraulic integrity, the holder of this environmental authority must immediately take action to prevent or minimize any actual or potential environmental harm, and report in writing any findings and actions taken to the administering authority within 28 days of that event.
H1-7	The holder of this environmental authority must not abandon any dam but must decommission each dam such that ongoing environmental harm is prevented.
H1-8	As a minimum, decommissioning must be conducted such that each dam: <ul style="list-style-type: none"> (a) either: <ul style="list-style-type: none"> i. a stable landform, that no longer contains flowable substances, or ii. approved or authorised under relevant legislation for a beneficial use, or iii. is a void authorised by the administering authority to remain after decommissioning; and (b) compliant with the rehabilitation requirements of this environmental authority.
Regulated dams – Location and Basic Specifications	
H2-1	The following are the only regulated dams authorised under this environmental authority, and those dams are to be located within the control points defined in Schedule H - Table 1 (Location of regulated dams).
H2-2	The following are the only regulated dams authorised under this environmental authority, and those dams are to accord with the basic specifications in Schedule H - Table 2 (Basic specification of regulated dams).

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H2-3	The following are the only regulated dams authorised under this environmental authority, and those dams are to accord with the hydraulic specifications in Schedule H - Table 3 (Hydraulic performance of regulated dams) below.
Regulated Dams – Certification and Operation	
H3-1	Documentation required by the conditions in this schedule must be kept available for inspection by the regulating authority for a period of five (5) years after the conclusion of the environmentally relevant activity in respect of which this environmental authority has been granted.
H3-2	The holder of this environmental authority must not commence construction of a regulated dam unless: <ul style="list-style-type: none"> (a) the holder has submitted to the administering authority two copies of a design plan, together with the certification of a suitably qualified and experienced person that the design of the regulated dam will deliver the performance stated in the design plan and that it will be compliant in all respects with this environmental authority, and (b) at least 20 business days has passed since the receipt of those documents, or the administering authority notifies the holder that a design plan and certification, has been received.
H3-3	Each regulated dam design plan under this authority must consider the likely outcomes for releases to the environment using estimates of likely contaminant concentrations using data from contact testing, output from modelling on site and modelling for flows in the nearby watercourses.
H3-4	Each regulated dam design plan under this authority must include the outcomes from water balance modelling, of at least the five worst case scenarios of wet season storage and discharges. This information must be presented graphically at a suitable time step and be able to compare the incident rainfall, runoff and environmental releases for all regulated dams.
H3-5	When construction or modification of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority two copies of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and that it will be compliant in all respects with this environmental authority.
H3-6	The holder of this environmental authority must ensure that there is always a current operational plan for each regulated dam, which may form part of other plans required by legislation.
H3-7	The operational plan shall at least cover all matters relevant to the operation and maintenance of the regulated dam so that it is compliant in all respects with this environmental authority.
H3-8	The holder of this environmental authority must ensure that, where a current operational plan covers decommissioning and rehabilitation, those operations are consistent with the objectives in any design plan for the dam.
H3-9	The holder of this environmental authority must notify the administering authority immediately when the level in any regulated dam reaches the mandatory reporting level (MRL) and confirm in writing within seven (7) days .
Regulated Dams - Annual Inspection and Report	
H4-1	The holder of this environmental authority must arrange for each regulated dam to be inspected annually by a suitably qualified and experienced person, in accordance with conditions H4-2 to H4-7 below.
H4-2	The annual inspection may be conducted as early as 1 st September each year, but not later than 1 st November each year, except that the assessment of adequacy of available storage in a dam must be based on dam levels observed within the month of October in the year that the inspection is conducted.
H4-3	At each annual inspection, the condition of each regulated dam must be assessed, including the structural, geotechnical and hydraulic adequacy of the dam and the adequacy of the works with respect to dam safety, and any recommended actions conveyed immediately to the holder of this environmental authority.
H4-4	The holder of this environmental authority must immediately act upon recommendations arising from an annual inspection on condition and adequacy of a dam.
H4-5	At each annual inspection, the adequacy of the available storage against the design storage allowance specified must be assessed and, if a mandatory reporting level is required, it must be determined and marked on each regulated dam.
H4-6	A final assessment of adequacy of available storage in each regulated dam must be based on a dam level observed within the month of October, accepted as valid by the suitably qualified and experienced person, and resulting in an estimate of the level in that dam as at 1 November .
H4-7	For each annual inspection, two copies of a report certified by the suitably qualified and experienced person, including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority by 1 December .

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**Flood Protection Levee**

H5-1	<p>The design plan in accordance with condition H3-2 must include:</p> <p>(a) drawings describing the location and dimensions of the levee and the mining excavations in the vicinity of the levee, including confirmation the levee meets the specified design requirements in condition H5-2; and</p> <p>(b) a documented procedure for surveillance of the levee and any adjacent mining excavation slopes to detect and report to the administering authority any ground movement that compromises or may compromise the integrity of the levee.</p>
H5-2	<p>Design requirements for the levee and adjacent mining excavation include:</p> <p>(a) the design level of the levee crest shall be 0.5m above the estimated AEP 1 in 500 flood event for the adjacent watercourses; and</p> <p>(b) mining excavation slopes adjacent to the levee must remain stable and are to be designed with a factor of safety of 1.5 or above based on an accepted stability analysis.</p>
H5-3	<p>The flood protection levee authorised under this environmental authority must be constructed and maintained such that:</p> <p>(a) it does not result in increased erosion of the bank or bed of any adjacent creek or river;</p> <p>(b) it does not significantly impact upon riparian or existing remnant vegetation; and</p> <p>(c) the levee itself will not erode during any flood events up to the AEP 1 in 500 event.</p>

Flood Protection Levee – Inspection and Remedial Works

H6-1	The condition of constructed levees including the surface area between the downstream toe of the levee and the end wall crest of the open-cut mining pit should be monitored for surface cracks and must at a minimum be inspected and assessed by a suitably qualified and experienced person at least once per year between the months of May and October inclusive (i.e. during the 'dry' season and before the onset of the 'wet' season), and at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.
H6-2	For each levee annual inspection, two copies of the inspection report, including any recommendations for remedial works, must be provided to the administering inspection within twenty-eight (28) days of the date of inspection.
H6-3	Remedial works identified as being required for the flood protection levee during the inspections and assessments conducted under conditions H6-1 and H6-2, must be notified in writing to the administering authority within five (5) business days of the completion of the inspections, and commenced within twenty-eight (28) days unless otherwise agreed in writing by the administering authority.
H6-4	The annual return for this environmental authority shall be accompanied by a report, by a suitably qualified and experienced person, that certifies that the documented procedure for levee inspection has been applied in accordance with the procedure, that there has been no erosion, cracking or vertical or horizontal deformation that has impacted on the integrity of the levee, and that the levee has been maintained in accordance with the certified design plan.

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Schedule C - Table 1 (Discharge locations)

Authorised discharge point	Latitude (GDA94)	Longitude (GDA94)	Location description
Release Point 1 from Release Dam 1 (Existing IP)	614860	7569533	Release Dam 1 to Smoky Creek
Release Point 2 from Release Dam 2 (Existing IP)	616581	7567121	Release Dam 2 to Billy's Gully
Release Point 3 (MS1) from Release Dam 3 (Expansion Area)	623469	7557505	Release Dam 3 to Isaac River
Release Point 4 (MS2) from MIA Retention Pond	621101	7559584	MIA Retention Pond to Isaac River

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(Expansion Area)

Schedule C - Table 2 (End of pipe contaminant release limits)

<u>Quality characteristic</u>	<u>Units</u>	<u>Minimum</u>	<u>Maximum</u>
<u>pH</u>	<u>pH units</u>	<u>6.5</u>	<u>8.5</u>
<u>Electrical Conductivity</u>	<u>µS/cm</u>	<u>N/A</u>	<u>Please see cover letter</u>
<u>Turbidity</u>	<u>NTU</u>	<u>N/A</u>	<u>500 or upstream value + 10%</u>

Schedule C - Table 3 (End of pipe contaminant trigger values)

<u>Quality characteristic</u>	<u>Units</u>	<u>Minimum</u>	<u>Maximum</u>
<u>Aluminium</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Total Arsenic</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Boron</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Cadmium</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Chromium (CrVI)</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Copper</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Iron</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Lead</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Manganese</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Mercury (inorganic)</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Molybdenum</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Nickel</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Nitrate (NO₃)</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Selenium (total)</u>	<u>µg/L</u>	<u>N/A</u>	
<u>Sulphate</u>	<u>mg/L</u>	<u>N/A</u>	

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Zinc	µg/L	N/A	

Note: Metals to be measured for total and dissolved

Schedule C - Table 4 (End of pipe monitoring locations and frequencies)

Monitoring Point	Location Description	Latitude (GDA94)	Longitude (GDA94)	Frequency
Release Dam 1 Discharge Point (Existing IP)	Smoky Creek monitoring point	614860	7569533	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased, for parameters in Schedule C - Table 2 (End of pipe contaminant release limits).
Release Dam 2 Discharge Point (Existing IP)	Billy's Gully monitoring point	616581	7567121	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased, for parameters in Schedule C - Table 2 (End of pipe contaminant release limits).
Proposed Release Dam 3 Discharge Point (MS1) (Expansion Area)	Isaac River Downstream monitoring point	623469	7557505	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased, for parameters in Schedule C - Table 2 (End of pipe contaminant release limits).
MIA Retention Pond Discharge Point (MS2) (Expansion Area)	Isaac River Upstream monitoring point	621101	7559584	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased, for parameters in Schedule C - Table 2 (End of pipe contaminant release limits).

Schedule C - Table 5 (Flow events for authorised discharge)

Upstream Flow Monitoring Point	Monitoring Point Description	Latitude (GDA94)	Longitude (GDA94)	Minimum	Frequency
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W1 (Existing IP)	Smoky Creek Upstream	616648	7570677	2 m ³ /sec	Daily during discharge
W3 (Existing IP)	Billy's Gully Upstream	618488	7566780	2 m ³ /sec	Daily during Discharge
WQ5 (Expansion Area)	Isaac River Upstream	621432	7560207	2 m ³ /sec	Daily during Discharge

Note: Minimum flow can vary from but there must be a measurable volume

Schedule C - Table 6 (Receiving water monitoring locations and frequency)

Sampling location	Location Description	Latitude (GDA94)	Longitude (GDA94)	Frequency
Upstream Reference Point				
W1 (Existing IP)	Smoky Creek Upstream	616648	7570677	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).
W3 (Existing IP)	Billy's Gully Upstream	618488	7566780	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).
WQ5 (Expansion Area)	Isaac River Upstream	621432	7560207	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).
Downstream Reference Point				
W2 (Existing IP)	Smoky Creek Downstream	614811	7569122	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until

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				discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).
W4 (Existing IP)	Billy's Gully Downstream	616301	7566347	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).
WQ6 (Expansion Area)	Isaac River Downstream	625262	7557079	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter until discharge has ceased for parameters in Schedule C - Table 9 (Receiving water monitoring locations and frequency).

Schedule C - Table 7 (Receiving water contaminant limits)

Parameter	Unit	Receiving Water Limits	Limit Type
pH	pH units	6.5 – 8.5	Minimum - Maximum
Electrical Conductivity	µS/cm	1000	Maximum

Schedule C - Table 9 (Receiving water contaminant trigger levels)

Parameter ¹	Unit	Trigger Levels
Aluminium	µg/L	
Total Arsenic	µg/L	
Boron	µg/L	
Cadmium	µg/L	
Chromium (CrVI)	µg/L	
Copper	µg/L	
Iron	µg/L	
Lead	µg/L	

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Manganese	µg/L	
Mercury (inorganic)	µg/L	
Molybdenum	µg/L	
Nitrate (NO ₃)	µg/L	
Nickel	µg/L	
Selenium (Total)	µg/L	
Sulphate	mg/L	
Zinc	µg/L	

Note 1: All parameters are dissolved unless specified.

Schedule C - Table 10 (Non-Discharge Water Quality Monitoring and Frequency)

Parameter	Unit	Frequency
Electrical Conductivity	µS/cm	Upon commencement of natural flow, then weekly during natural flow.
pH	pH units	Upon commencement of natural flow, then weekly during natural flow.
Total Suspended Solids	mg/L	Upon commencement of natural flow, then weekly during natural flow
Flow rate	m ³ /sec	Upon commencement of natural flow, then weekly during natural flow

Schedule C - Table 13 (Groundwater monitoring locations and frequency)

Monitoring point	GDA 94	GDA 94	Monitoring Frequency
Burton Coal Bore 2	620496	7573778	Every 6 months
Swamp Bore 1	621630	7568969	
DNR 13060284	620383	7566501	
Near Field 1	621885	7559305	Every 6 months
Near Field 2	622270	7558817	Every 6 months
Near Field 3	620556	7556885	Every 6 months
Near Field 4	620600	7555041	Every 6 months
584d	622696	7556692	Every 6 months
594	622612	7555052	Every 6 months
Regional 1	624002	7558238	Every 6 months

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<u>Regional 3</u>	<u>623995</u>	<u>7555015</u>	<u>Every 6 months</u>
<u>*Stock watering bore 18</u>	<u>622909</u>	<u>7558529</u>	<u>Every 6 months</u>

*after the initial monitoring period, any stock water bores believed to be unreliable due to poor construction, age, corrosion and other factors may be removed from the monitoring program.

Schedule C - Table 14 (Groundwater investigation trigger levels)

<u>Parameter</u>	<u>Unit</u>	<u>Trigger Levels</u>	<u>Limit Type</u>
<u>pH</u>	<u>pH Units</u>	<u>6.5 - 8.5</u>	<u>Minimum/Maximum</u>
<u>Electrical Conductivity</u>	<u>µS/cm</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Total Dissolved Solids</u>	<u>mg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Calcium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Magnesium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Sodium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Potassium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Chlorine</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>SO4</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>CO3</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>HCO3</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Iron</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Aluminium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Silver</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Arsenic</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Mercury</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Antimony</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Molybdenum</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Selenium</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>
<u>Total Petroleum Hydrocarbons</u>	<u>µg/L</u>	<u>To be provided</u>	<u>Maximum</u>

Note: Trigger levels derived from existing groundwater monitoring data from unaffected sites



Schedule C - Table 15 (Sewage treatment effluent quality targets for dust suppression and irrigation)

Monitoring point	Quality characteristics	Release Limit			Frequency
		Minimum	50th Percentile	Maximum	
Treated effluent storage pond	5-day Biological Oxygen Demand (mg/L)	-	-	20	monthly
	Suspended Solids (mg/L)	-	-	30	
	Thermotolerant coliforms (CFU/100mL)	-	100	1000	
	Total Phosphorus (mg/L)	-	5	15	
	Total Nitrogen (mg/L)	-	10	30	
	pH	6.5	-	8.5	

Schedule H— Table 1 (Location of regulated dams)

Name of Regulated Dam	Latitude (GDA 94)	Longitude (GDA 94)
Cell 1	614553	7571813
Cell 2	614517	7571810
Cell 3	614480	7571807
Wet Season Storage	614577	7571790
Flood Protection Levee	N/A	N/A

Schedule H— Table 2 (Basic specification of regulated dams)

Name of Regulated dam	Hazard Category	Maximum surface area of dam (ha)	Maximum volume of dam (m³)	Maximum depth of dam (m)	Purpose of dam
Cell 1	Significant	0.52	7850	3.8	Temporary storage of fine coal tailings
Cell 2	Significant	0.50	7550	3.8	Temporary storage of fine coal tailings
Cell 3	Significant	0.48	7750	3.9	Temporary storage of fine coal tailings



Wet Season Storage	Significant	1.0	26500	4.0	Wet season overflow storage
Flood Protection Levee	To be determined	N/A	N/A	N/A	Flood protection

Schedule H — Table 3 (Hydraulic performance of regulated dams)

Name of Regulated dam	Spillway Capacity	Design Storage Allowance	Mandatory Reporting Level
	Diversion Capacity (Levees) AEP	(N/A for levees) AEP	(N/A for levees) AEP
Cell 1	1:1000 AEP	0	1:20 AEP 72 hr rainfall
Cell 2	1:1000 AEP	0	1:20 AEP 72 hr rainfall
Cell 3	1:1000 AEP	0	1:20 AEP 72 hr rainfall
Wet Season Storage	1:1000 AEP	1:20 AEP for 3 month wet season rainfall	1:20 AEP 72 hr rainfall
Flood Protection Levee	N/A	N/A	N/A

20.7 NOISE & VIBRATION

20.7.1 Noise

Noise from coal mining and related activities such as coal transportation and processing has the potential to disturb nearby residents in the absence of an adequate buffer distances or intervening barriers, or if there are inadequate source controls. At sufficiently loud levels, noise can be intrusive and adversely affect amenity.

The *Environmental Protection (Noise) Policy 1997* (EPP Noise) provides the framework for the management of obtrusive nuisance noise and vibration in Queensland under the EP Act. The EPP Noise does not set limits but:

- outlines the environmental values to be enhanced or protected;
- specifies environmental acoustic objectives;
- outlines the decision making process for managing noise and vibration; and
- sets out the community consultation processes for acoustic management.

The EPA is primarily responsible for regulating noise in Queensland and, in July 2004, approved and released Ecoaccess Guideline "Planning for Noise Control". The Guideline contains methods and procedures that are applicable for setting conditions relating to noise emitted from industrial premises, commercial premises and mining operations, and are intended for planning purposes. The Guideline is applicable to sounds from all sources, individually and in combination, which contribute to the total noise from a site.

This Guideline also includes criteria for estimating the probability of sleep disturbance from transient noise, such as heavy truck or rail operations, for various window types and settings. It may be used for assessing noises that contain impulsive components but it is not suitable for assessing noise that consists solely of discrete impulses, for example gunfire or blasting.

The procedure takes into account:

- the control and prevention of background noise creep in the case of a steady noise level from equipment such as that caused by ventilation fans and other continuously operating machinery;



- the containment of variable noise levels and short-term noise events, such as those caused by forklift trucks and isolated hand tools, to an 'acceptable' level above the background noise level; and
- the setting of noise levels that should not be exceeded to avoid sleep disturbance.

The methodology to set suitable limits identified in the EPA Ecoaccess Guideline "Planning for Noise Control" is a multi-step process involving measurement, comparison against acceptable maxima and correcting the measurements for the amount of leeway available between the acceptable/desirable levels and the measurements.

The Guideline *Assessment of Low Frequency Noise*, also released by the EPA, categorises items such as boilers, pumps, transformers, cooling fans, compressors, oil and gas burners, foundries, wind farms, electrical installations, diesel engines, ventilation and air-conditioning equipment, wind turbulence and large chimney resonance as sources of high level noise having a frequency content of less than 200 Hz as these sources exhibit a spectrum that characteristically shows a general increase in sound pressure level with a decrease in frequency.

Annoyance, due to low frequency noise, can be high, even though the noise level measured in dB(A) is relatively low. Typically, annoyance is experienced in the otherwise quiet environs of residences, offices and factories adjacent to, or near, low frequency noise sources. Generally, low level/low frequency noises become annoying when the masking effect of higher frequencies is absent. This loss of high frequency components may occur as a result of transmission through the fabric of a building, or in propagation over long distances. Where a noise emission occurs exhibiting an unbalanced frequency spectra, the overall sound pressure level inside residences should not exceed 50 dB (Linear) to avoid complaints of low frequency noise annoyance.

20.7.1.1 Environmental Values

The environmental values to be enhanced or protected under the EPP (Noise) are the qualities of the acoustic environment that are conducive to:

- the wellbeing of the community or a part of the community, including its social and economic amenity; or
- the wellbeing of an individual, including the individual's opportunity to have sleep, relaxation and conversation without unreasonable interference from intrusive noise.

The principal current sources of noise emissions include:

- traffic on the various local roads;
- general farming traffic (tractors, trucks, light vehicles);
- cattle; and
- activities at the surrounding mines including rail movements and rail siding facilities.

Section 20.5.1 lists the nearest existing mines and the nearest sensitive receptors to the IIPP.

20.7.1.2 Potential Impacts

The major operational noise and vibration sources at the IIPP will result from:

- dragline or truck and shovel operation in the pit;
- rockdrilling and blasting;
- coal haulage trucks between the Expansion Area ROM stockpile and CHPP, comprising B-doubles with prime mover and trailer configurations that would satisfy the ADR28 certification;
- dump trucks, loaders dozers etc; and
- various surface earth working machines.

There is also a railway line to Peak Downs 10 km, to the east and south of the site. The Peak Downs Highway is 5 km north of the Expansion Area.



The existing environment, with respect to noise and vibration, has been monitored over a number of years. Analysis suggests that traffic noise is still the major source of noise that is experienced by residences within several hundred metres of the Peak Downs Highway, despite the significant development of mines within the area. It is anticipated that construction and operational mine noise from the large number of mines in the area may be heard at some residences during the quieter periods of the evening and night. The calculated noise levels from activities within the pit and coal haulage complies with the noise level criteria during the day at all noise sensitive locations and for either shovel or dragline operations.

The calculated noise levels from pit operations complies with the day, evening and night noise level criteria at noise sensitive locations S2, S3 and S4 for either shovel or dragline operations.

However, as the operations progress to the southern half of the Expansion Area pit, the noise levels during the evening and night exceed the noise level criteria at S1, mainly because of haul trucks on top of the out-of-pit spoil.

20.7.2 Vibration

The main sources of vibration at the IIPP are likely to be from rock drilling and blasting. The EPA is primarily responsible for regulating noise and vibration in Queensland and has developed a number of guidelines. Those that are relevant to the management of noise and vibration at the IIPP are listed below.

EPA Ecoaccess Guideline - Noise and Vibration from Blasting

Blasting operations have the potential to cause excessive noise and vibration impacts on the community. Excessive levels of structural vibration caused by ground vibration can result in damage to, or failure of, a structure if not appropriately managed. However, people are able to detect vibration at levels much lower than those required to cause even superficial damage to the most susceptible structures.

The criteria set out in the Ecoaccess guideline "Noise and Vibration from Blasting", assist in minimising annoyance and discomfort that may be caused by blasting from activities such as mining, quarrying, construction and other operations which involve the use of explosives for fragmenting rock.

Further, all blasting must be carried out in a proper manner by a competent person in accordance with industry accepted standards to minimise the likelihood of adverse effects being caused by the impact of airblast overpressure and ground-borne vibration in noise-sensitive places, or to people living in or using the surrounding area.

Blasting Hours of Operation Criteria

Blasting at the existing Isaac Plains Coal Mine is currently approved under the existing EA, between the hours of 9 am and 7 pm Monday to Sunday. Blasting is not approved for other times and public holidays. Blasting outside these hours should only be approved where:

- blasting during the preferred times is clearly impractical (blasting on such occasions should be limited in number and more strict airblast overpressure and ground vibration limits should apply); or
- there is no likelihood of persons in a noise sensitive place being affected because of the remote location of the blast site.

IPCM however, generally conducts blasting only between the hours of 9 am to 3 pm, Monday to Friday, and from 9 am to 1 pm on Saturdays. Blasting should not generally take place on Sundays or public holidays. These criteria would also be applicable to the IIPP.

Noise criteria

At the existing Isaac Plains Coal Mine blasting activities must be carried out in such a manner that if blasting noise should propagate to a noise-sensitive place, then:

- the airblast overpressure must be not more than 115 dB(linear) peak for four out of five consecutive blasts; and
- the airblast overpressure must not exceed 120 dB(linear) peak for any blast.

These criteria would also be applicable to the IIPP.



Vibration criteria

At the existing Isaac Plains Coal Mine, blasting operations must be carried out in such a manner that if ground vibration should propagate to a noise-sensitive place:

- the ground-borne vibration must not exceed a peak particle velocity of 5 mm/second for four out of five consecutive blasts; and
- the ground-borne vibration must not exceed a peak particle velocity of 10 mm/second for any blast.

These criteria would also be applicable to the IIPP.

20.7.3 Environmental Protection Objectives and Control Strategies – Noise & Vibration

Environmental Protection Objectives And Control Strategies - Noise & Vibration						
Environmental Value	Existing noise and vibration levels at sensitive receptors (local rural residences).					
Environmental Protection Objective	To take all reasonable and practicable measures to avoid or minimise the potential for nuisance noise and vibration from the mining activities on noise sensitive receptors.					
Performance Indicators/Criteria	No unlawful nuisance noise levels at these homesteads. Number of noise and vibration complaints. Blasts will be designed to achieve airblast and ground vibration criteria at surrounding sensitive locations. Noise Limits at Noise Sensitive Places					
Noise Descriptor dB(A) measured as	Monday to Saturday (including public holidays)			Sunday and public holidays		
	7am – 6pm	6pm – 10pm	10pm – 7am	7am – 6pm	6pm – 10pm	10pm – 7am
Noise measured at a 'Sensitive Receptor'						
LA10, adj, 10 mins	Background + 5	Background + 5	Background + 3	Background + 5	Background + 5	Background + 3
LA1, adj, 10mins	Background + 10	Background + 10	Background + 5	Background + 10	Background + 10	Background + 5
Noise measured at a 'Commercial place'						
L _{A10} , adj, 10 mins	B/g + 10	B/g + 10	B/g + 5			
L _{A1} , adj, 10 mins	B/g + 15	B/g + 15	B/g + 10			
NB: This table does not purport to set operating hours for the mining activities.						
Airblast Overpressure Level*						
Noise Parameter	Airblast Overpressure measured at a sensitive place					
	Monday to Sunday 9am - 7pm			Other times and public holidays		
Air blast overpressure level (dB [Lin] Peak)	Maximum 115 dB for 4 out of 5 consecutive blasts			No blasting to occur		
Air blast overpressure level (dB [Lin] Peak)	120 dB maximum			No blasting to occur		
* This table does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.						
Vibration Limits*						
Vibration Parameter	Vibration measured at a sensitive place					
	Monday to Sunday 9am - 7pm			Other times and public holidays		
Peak particle velocity (mm/s)	Maximum 5 mm/s for 4 out of 5 consecutive blasts			No blasting to occur		



Environmental Protection Objectives And Control Strategies - Noise & Vibration			
	Peak particle velocity (mm/s)	10 mm/s maximum	No blasting to occur
	*This table does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.		
Control Strategies & Commitments	<p>Acoustic Controls</p> <p>Acoustic control measures which may be incorporated into the project to achieve the performance criteria outlined above include:</p> <ul style="list-style-type: none"> • low noise specifications for all plant, equipment and vehicles; • fitment of high-performance mufflers and similar measures to vehicles, plant and equipment; • mobile equipment to be fitted with other appropriate silencing equipment as required; • all equipment will be well maintained; <p>Operational control measures which may be incorporated into the project to achieve the performance criteria outlined above include:</p> <ul style="list-style-type: none"> • haulage operations to the CHPP will mostly be limited to daytime only and during the period Monday to Friday; • mine truck operations limited to the pit and pit to ROM (eastern side of out-of-pit spoil heaps) during the evening and night period; • design work areas to reduce noise generation and minimise the periods of time that mobile plant must reverse; • design of pit and spoil areas to avoid operation of dump trucks in open areas or elevated areas at night; • limit operational characteristic of vehicles (i.e. limit operation of air brakes except in cases of emergency); • temporary noise barriers (earth berms etc) to reduce noise at noise sensitive receptors; • use of squawker (white noise) reversing alarms or reversing strobe lights; and • appropriate programming of activities (e.g. hours of work at particular locations). <p>IPCM is committed to conducting ongoing training to ensure dragline operators have the skills to operate the machine in the quietest possible manner while still maintaining productivity rates. In addition IPCM will conduct field verification for noise emissions from the dragline bucket during mining operations and will compare these results against modelled results. Should emissions be found to be excessive, appropriate control strategies will be developed in conjunction with the administering authority.</p> <p>In the unlikely event that night time haulage is required, and complaints are received, screening of the haul truck by either spoil heap or specially constructed mounds will be implemented as required.</p> <p>A shut-down procedure (Trigger Action Response Plan (TARP)) will be implemented at the site in the event of significant and sustained adverse meteorological conditions. The procedure will be set up for use at the commencement of mining activities in the Expansion Area.</p> <p>Should these measures still not allow the performance criteria to be achieved then negotiations may be entered into with the 'receiver' to provide compensation.</p> <p>Blasting</p> <p>Explosive blasts required for the mining activity will be designed by a competent person to achieve the criteria specified in the Airblast Overpressure and Vibration Limits tables above.</p> <p>All relevant information pertaining to the design of explosive blasts for the mining activity in relation to the criteria specified in the aforementioned tables will be kept in written and diagrammatic form.</p> <p>Blasting will only be carried out between 9 am to 7 pm, Monday to Sunday and no blasting will occur at other times and on public holidays. Where blasting is required outside of these times, appropriate consultation will be undertaken with directly affected residents in advance of blasting and approval obtained from the EPA. Blasting outside these recommended times should be approved only where:</p> <ul style="list-style-type: none"> • blasting during the preferred times is clearly impracticable (in such situations blasts should be limited in number and stricter airblast overpressure and ground vibration limits should apply); or • there is no likelihood of persons in a noise-sensitive place being affected because of the remote location of the blast site. <p>Although not a requirement of the site EA, IPCM will monitor blasting events, i.e. blast overpressure and ground vibration, and will also video the blast event.</p> <p>Complaints/Monitoring</p> <p>Investigate any noise complaint expeditiously and respond to complainant.</p> <p>Complaints will be recorded in the site complaints/incidents register.</p> <p>Noise monitoring carried out in response to complaints and will be undertaken in accordance with the</p>		

IIPP Amalgamated Environmental Impact Statement

Environmental Management Plan



Environmental Protection Objectives And Control Strategies - Noise & Vibration

requirements of the *Environmental Protection (Noise) Policy 1997*. Results will be assessed against the Noise Limits at Noise Sensitive Places as outlined in *Guideline 8: Preparing an Environmental Management Overview Strategy for Non-standard mining projects*.

When requested by the administering authority, noise monitoring will be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.

Noise monitoring will include:

- a) ~~L_{Amax} adj, T_LLA10, adj, 10min;~~
- a)b) ~~LA1, adj, 10min;~~
- b) ~~relevant background sound level;~~
- c) the level and frequency of occurrence of impulsive or tonal noise;
- d) atmospheric conditions including wind speed and direction; and
- e) location, date and time of recording.

If monitoring indicates exceedence of the limits in ~~tables provided above, i.e. Noise Limits at Noise Sensitive Places and Airblast Overpressure Level~~the approved EA, then IPCM will:

- a) address the complaint including the use of appropriate dispute resolution if required; and
- b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

The method of measurement and reporting of noise levels will comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

If IPCM can provide evidence through blast monitoring that the limits defined in ~~the table provided above, i.e. Vibration Limits (refer to Performance Indicators/Criteria listed above)~~the approved EA are not being exceeded then they are not in breach. Monitoring will include:

- a) peak particle velocity (~~mm/s~~);
- b) air blast overpressure level (dB linear peak);
- c) location of the blast/s within the mining area (including which bench level);
- d) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
- e) location, date and time of recording.

Mining activities will not cause environmental nuisance where noise from the mining activities does not exceed the criteria specified in the ~~Vibration Limits table provided above~~approved EA conditions.

If monitoring indicates exceedence of the ~~vibration~~ limits in the ~~Vibration Limits table~~approved EA conditions, then IPCM will:

- a) address the complaint including the use of appropriate dispute resolution if required; and
- b) immediately implement ~~noise vibration~~ abatement measures so that ~~vibration~~ emissions of noise from the activity do not result in further environmental nuisance.

20.7.4 Proposed EA Conditions

Proposed EA Conditions	
Noise Nuisance	
G1-1	Noise from activities must not cause an environmental nuisance at any sensitive receptor or commercial place.
G1-2	All noise from activities must not exceed the levels specified in Schedule G - Table 1 (Noise limits) at any sensitive receptor or commercial place.
Noise Monitoring	

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IIPP Amalgamated Environmental Impact Statement

Environmental Management Plan



Proposed EA Conditions

G2-1 When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of noise nuisance and the results must be notified within **fourteen (14) days** to the administering authority. Monitoring must include:

- (a) $L_{A10, adj, 10 mins}$
- (b) $L_{A1, adj, 10 mins}$
- (c) the level and frequency of occurrence of impulsive or tonal noise;
- (d) atmospheric conditions including wind speed and direction;
- (e) effects due to extraneous factors such as traffic noise; and
- (f) location date and time of recording.

G2-2 Noise is not considered to be a nuisance under condition G1-1 if monitoring shows that noise does not exceed the following levels in the time periods specified in Schedule G - Table 1 (Noise limits).

G2-3 If monitoring indicates exceedence of the relevant limits in Schedule G - Table 1 (Noise limits) and Schedule G - Table 2 (Airblast overpressure level) as a result of the activities, then the environmental authority holder must:

- (a) address the complaint including the use of appropriate dispute resolution if required; and
- (b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

G2-4 The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

Vibration Nuisance

G3-1 Subject to Conditions G3-2 and G3-3 vibration from the mining activity must not cause an environmental nuisance, at any sensitive place.

G3-2 When requested by the administering authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within **fourteen (14) days** to the administering authority following completion of monitoring.

G3-3 If the environmental authority holder can provide evidence through monitoring that the limits defined in Schedule G - Table 3 (Vibration limits), are not being exceeded then the holder is not in breach of Condition (G3-1). Monitoring must include:

- (a) peak particle velocity (mm/s);
- (b) air blast overpressure level (dB linear peak);
- (c) location of the blast/s within the mining area (including which bench level);
- (d) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
- (e) location, date and time of recording.

G3-5 If monitoring indicates exceedence of the limits in Schedule G - Table 3 (Vibration limits), then the environmental authority holder must:

- (a) address the complaint including the use of appropriate dispute resolution if required; and
- (b) immediately implement vibration abatement measures so that vibration from the activity do not result in further environmental nuisance.

G3-6 Every explosive blast for the mining activity shall be designed by a competent person to achieve the criteria specified in Schedule G - Table 2 (Airblast overpressure level) and Schedule G - Table 3 (Vibration limits).

G3-7 All relevant information pertaining to the design of every explosive blast for the mining activity in relation to the criteria specified in Schedule G - Table 2 (Airblast overpressure level) and Schedule G - Table 3 (Vibration limits) shall be kept in written and diagrammatic form.

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**Schedule G - Table 1 (Noise limits)**

Noise level dB(A)	Monday to Sunday (including public holidays)		
	7am - 6pm	6pm - 10pm	10pm - 7am
Noise measured at a 'Sensitive Receptor'			
<u>L_{A10}, adj, 10 mins</u>	<u>B/g + 5</u>	<u>B/g + 5</u>	<u>B/g + 3</u>
<u>L_{A1}, adj, 10 mins</u>	<u>B/g + 10</u>	<u>B/g + 10</u>	<u>B/g + 8</u>
Noise measured at a 'Commercial place'			
<u>L_{A10}, adj, 10 mins</u>	<u>B/g + 10</u>	<u>B/g + 10</u>	<u>B/g + 5</u>
<u>L_{A1}, adj, 10 mins</u>	<u>B/g + 15</u>	<u>B/g + 15</u>	<u>B/g + 10</u>

Schedule D - Table 1 (Noise limits)

Noise Descriptor dB(A) measured at	Monday to Saturday			Sundays and public holidays		
	7am - 6pm	6pm - 10pm	10pm - 7am	7am - 6pm	6pm - 10pm	10pm - 7am
<u>L_{A10}, adj, 10 mins</u>	Background + 5	Background + 5	Background + 3	Background + 5	Background + 5	Background + 3
<u>L_{A1}, adj, 10 mins</u>	Background + 10	Background + 10	Background + 5	Background + 10	Background + 10	Background + 5

Where "Background" means background sound pressure level measured in accordance with the latest edition of the Environmental Protection Agency Noise Measurement Manual.

Schedule D - Table 1 does not purport to set operating hours for the mining activities.

Schedule D - Table 2 (Airblast Overpressure Level)*

Noise Parameter	Airblast Overpressure measured at a sensitive place	
	Monday to Sunday 9am - 7pm	Other times and public holidays
Air blast overpressure level (dB [Lin] Peak)	Maximum 115 dB for 4 out of 5 consecutive blasts	No blasting to occur
Air blast overpressure level (dB [Lin] Peak)	120 dB maximum	No blasting to occur

* Schedule D Table 2 does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.

Schedule D - Table 3 (Vibration limits)*

Vibration Parameter	Vibration measured at a sensitive place	
	Monday to Sunday 9am - 7pm	Other times and public holidays
Peak particle velocity (mm/s)	Maximum 5 mm/s for 4 out of 5 consecutive blasts	No blasting to occur
Peak particle velocity (mm/s)	10mm/s maximum	No blasting to occur

* Schedule D Table 3 does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.

20.8 WASTE

Waste management involves the administration and control of all activities involving waste materials. Administration activities include but are not limited to costs, responsibilities and priorities. Other activities include prevention, elimination, reduction, recycling, treatment and disposal of the waste material in order of preference.



The *Environmental Protection (Waste Management) Regulation 2000* provides an outline of the waste management strategies for Queensland including:

- littering;
- waste receivable and disposal; and
- waste tracking and transportation.

The objective of the Regulation is to:

- minimise the impact of wastes on the Queensland environment; and
- establish a framework for minimising wastes under Ecologically Sustainable Development (ESD) principles.

IPCM is committed to minimising the impact of waste on the environment and the community wherever practicable through the adoption of the waste management hierarchy principles detailed in Section 10 of the *Environmental Protection (Waste Management) Policy 2000*. IIPP's waste management hierarchy entails:

- waste avoidance;
- waste re-use;
- waste recycling;
- energy recovery from waste; and
- waste disposal.

Cleaner production, pollution prevention and waste minimisation are important components for the overall IIPP waste management strategy. In addition to Queensland's regulatory requirements for waste management, the IIPP will be required to comply with relevant National Environment Protection Measures (NEPM) developed by the National Environment Protection Council's (NEPC). The relevant NEPM for the IIPP is the National Pollutant Inventory (NPI) in which emissions of pollutants and wastes, whether discharged to land, air or water, on or off-lease which will be required to be considered and reported on, by IPCM for the IIPP under the requirements of the NPI.

Cleaner production refers to the continuous development and implementation of a strategy to prevent waste generation from processes and products, so as to reduce the risks to public health and safety and the environment. Furthermore, a cleaner production approach minimises the energy and materials used and the waste generated in processes, products and services to meet these objectives. IPCM recognises that cleaner production has both economic and environmental benefits and to the extent practicable, has introduced appropriate techniques into the IIPP. Similar techniques, including the selection of the re-use of waste water and recycling of products, would be extended to apply to the IIPP, with appropriate refinements on the basis of operational experience.

A continuous improvement approach will be implemented for the IIPP, by reviewing and modifying (as required) processes, materials and operating practices throughout the mine life as well as through techniques such as input substitution (consider alternative fuel sources) and improved operation and maintenance. In addition, IPCM propose to continue to develop strategies involving waste reduction, reuse and resource recovery as the preferred waste management principles for the IIPP. Rainwater runoff recovery from disturbed areas and its reuse is an example of this strategy which lessens the reliance on *in-situ* water resources.

Waste planning, such as the separation of components of the waste stream at the point of generation, will be implemented for the IIPP, and provide IPCM with the flexibility to maintain segregation of different types of waste during generation, storage and transportation.

This practice allows for the recovery of reusable or recyclable waste materials which would otherwise be disposed of or destroyed. This waste planning strategy also has the added advantage of reducing the level of risk associated with pollution generation, both on-site and off-site, that may otherwise result from inappropriately managed wastes.

20.8.1 Potential Impacts

Wastes generated by IPCM consist of the following regulated and general wastes:



- redundant equipment and plant;
- materials sent off site for disposal or recycling;
- used packaging, including chemical containers and drums;
- regulated wastes, including spent oils, greases and fuels and sewage sludge;
- contaminated personal protective equipment (PPE) including gloves and disposable overalls;
- products no longer in use or whose expiry date has lapsed;
- products which may have come into contact with another material rendering it useless; and
- materials stored on site for which there is no future use, or its means of disposal is not apparent.

Mine wastes also have the potential to impact on the environment.

Spoil

The primary mining waste generated by the IIPP will be spoil from the open cut mining operations. Waste generated by the IIPP will also include rejects removed during the coal preparation processes which comprise a mixture of non-coal materials, e.g. rocks such as volcanics, shale, siltstone, mudstone or claystone, and sand, silts and clays which either occur naturally within the coal seam or intrude the seam or dilute the coal during mining. With an expected product yield of 83 %, an estimated 0.68 Mtpa of coal rejects will annually be produced from a ROM coal production of raw 4 Mtpa.

The results indicate that the spoil materials in the Expansion Area are expected to be predominantly non-acid forming (NAF) with a low sulphide (pyrite) content. Some of the carbonaceous materials occurring immediately above and below the LHD Coal Seam may be potentially acid forming (PAF) due to an increased sulphide (pyrite) content. Although these materials are likely to only have a low capacity to generate acid, they will need to be managed correctly in order to minimise the risk of creating acidic conditions or ARD.

The samples tested also indicate that the materials are generally non-saline to slightly saline and therefore saline conditions or salt release is not expected to be a concern for water quality or revegetation. A significant proportion of the spoil is likely to be moderately sodic and dispersive and if these materials are left exposed for long periods of time, problems with stability, erosion and revegetation may arise.

The spoil is likely to contain relatively high concentrations of Arsenic (As), Antimony (Sb) and Selenium (Se), and of these, Se is likely to be relatively soluble. Cobalt (Co) and Molybdenum (Mo) are also relatively soluble, however, these elements were not found to occur in high concentrations in the spoil.

The out-of-pit spoil dumps, containing spoil from the initial box-cuts, are not expected to present an ARD or salinity risk provided the identified low risk PAF material from immediately above and below the LHD Coal Seam is isolated. In-pit spoil dumps are not expected to present an ARD or salinity risk provided the identified low risk PAF material from immediately above and below the LHD Coal Seam is buried deep within the dumps.

Spoil materials at the existing Isaac Plains Coal Mine are also not expected to present an ARD risk with results of the geochemical test work indicating that spoil at the existing Isaac Plains Coal Mine is non-acid forming (NAF) with a low S content (<0.1 %S) and moderate neutralising capacity (average ANC of 33 kg H₂SO₄/t).

Coal Seam

The current testing program has established that some of the carbonaceous materials occurring immediately above and below the LHD Coal Seam in the Expansion Area have an increased sulphide (pyrite) content and may be PAF, however with only a relatively low capacity to generate acid.

Due to the geochemical variability of the coarse and fine rejects derived from the different coal seams within the Expansion Area, further work will be carried out based on the actual recombined co-disposal material once the Expansion Area is approved and mining commences. The program includes the



collection of representative samples of both coarse and fine reject material from the CHPP over a number of days. The samples collected will initially be geochemically characterised using acid-base accounting and further geochemical testing may be required for selected samples, including modified NAG testing and leach column testing. This will enable the evaluation of appropriate management strategies for the disposal and capping of the coarse and fine reject material.

The multi-element scans indicated that Mo and Se were relatively soluble in a number of the samples tested and that Co was readily soluble in one of the samples tested, which gave an exceedance in the short-term and long-term ANZECC irrigation water quality guidelines. Elements As and Sb were detected but not found to be readily soluble.

Coal Rejects

The results from the assessment of samples indicate that some of the coarse and fine rejects from the Expansion Area operations are likely to be PAF. Some of the materials may also be significantly acid consuming. Due to the expected large variation in the acid forming characteristics of these materials, and the expected occurrence of PAF rejects from the existing Isaac Plains Coal Mine operations, further geochemical testing on the coarse and fine reject materials will be required to further evaluate the acid forming characteristics of the material and to evaluate appropriate management strategies.

Testing found that the coal rejects (coarse and fine) are expected to contain high concentrations of Se compared to the average crustal abundance. The contained Se content is expected to be relatively soluble.

If PAF materials occur in the blended coarse and fine reject material and if these materials are not managed correctly, acid generation and ARD may occur resulting in low pH conditions. If low pH conditions are allowed to occur in these materials, metal solubilities will increase resulting in unacceptable releases of at least As, Co, Fe and Se in surface water runoff and ultimately into the release dam.

Given the nature of general and regulated waste streams generated on-site, the impact on the air, water and land resources on-site are not expected to be significant.

In conclusion, waste from mine activities will be managed to ensure there are no unacceptable environmental impacts and comply with EPA statutory requirements.

20.8.2 Environmental Protection Objectives and Control Strategies - Waste

Environmental Protection And Control Strategies - Waste	
Environmental Value	Wastes are managed to ensure no environmental harm is caused.
Environmental Protection Objective	Waste will be managed to avoid adverse impacts on the health of the workforce and minimise risk of impact on land, air and water.
Performance Indicators/Criteria	<p>Volume or mass of recycled materials.</p> <p>Temporary storage and final disposal of waste types in authorised locations.</p> <p>Implementation of overburden monitoring program.</p> <p>Stock excluded from waste storage/disposal areas.</p> <p>Presence of appropriate bins and containers.</p> <p>Presence of appropriate signage.</p> <p>Waste tracking requirements from <i>Environmental Protection (Waste Management) Regulation 2000</i>.</p> <p>Contamination of soils assessed against <i>Draft Guidelines for the Assessment & Management of Contaminated Land in Queensland</i>.</p>
Control Strategies and Commitments	<p>Develop and implement a Waste Management Plan for the IIPP.</p> <p>Install containers and other facilities for receivable of various waste types. Install appropriate instructional and warning signage.</p> <p>Wastes will be classified, quantified, segregated and recorded at source to facilitate waste management.</p> <p>Where possible and practical, vegetation waste from clearing will be respread on rehabilitated areas. Vegetation waste will only be burnt as a last resort, and only if there is minimal risk of causing nuisance to neighbouring residences.</p> <p>General waste will not be burnt or allowed to burn on site unless permitted by the administering</p>



Environmental Protection And Control Strategies - Waste	
	<p>authority.</p> <p>General wastes and limited regulated wastes will be either disposed of on-site or transported off-site for disposal at appropriately licensed facilities. Regulated wastes capable of being economically recycled (e.g. waste oil, light vehicle tyres, used batteries) will be sent to a licensed recycling facility.</p> <p>Regulated waste (including waste oil but excluding sewerage sludge and abrasive blasting waste) will be removed from site by licensed regulated waste transport contractors for recycling by licensed recycler or disposal in a licensed regulated waste disposal facility under the provisions of the EP Act. Waste tracking systems will be maintained for the disposal of regulated wastes.</p> <p>Hydrocarbon contaminated materials (oily rags, oil filters etc) and waste oil will be removed by a licensed regulated waste contractor.</p> <p>Sewage will be treated through a septic tank and transpiration trench.</p> <p>Tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options will be stored in stable stacks and at least 10 m from any other scrap tyre storage area, or combustible or flammable material, including vegetation.</p> <p>All reasonable and practicable fire prevention measures will be implemented, including removal of grass and other materials within a 10 m radius of the scrap tyre storage area.</p> <p>Where no feasible recycling or waste-to-energy options are available, disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable. Records will be maintained illustrating the location of tyre burial.</p> <p>Scrap tyres disposed within the operational land will be placed so as not to impede saturated aquifers and/or compromise the stability of the consolidated landform.</p> <p>All petroleum products and other hazardous goods (chemicals) will be stored in banded areas sized in accordance with <i>AS1940 Storage and Handling of Flammable and Combustible Liquids</i>.</p> <p>Temporary field storages will be banded, although appropriately sized earthen bunds may be used. Drums from 20 L to 205 L capacity will be placed within banded areas when not in use.</p> <p>A register of all chemicals stored on site will be developed and maintained.</p> <p>All workshops and mobile refuelling trucks will be equipped with 'Spill Cleanup Equipment'.</p> <p>Hydrocarbon management training will be provided to all staff working in areas where hydrocarbons are used on a daily basis such as the workshops and fleet vehicles. Hydrocarbon skimmers will be installed in workshop water sumps and will be cleaned and maintained on a regular basis.</p> <p>Waste accumulating in oil/water separators will be appropriately disposed of.</p> <p>Any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the <i>Environmental Protection Act 1994</i>.</p> <p>Any contamination of soils shall be assessed against the Draft Guidelines for the <i>Assessment & Management of Contaminated Land in Queensland (1998)</i> or subsequent versions.</p> <p>Mining Waste</p> <p>A significant proportion of the spoil is likely to be moderately sodic and dispersive and if these materials are left exposed for long periods of time, problems with stability, erosion and revegetation may arise. Therefore they will be progressively rehabilitated.</p> <p>Post mining PAF material from immediately above and below the LHD Coal Seam will be isolated and buried deep within the in-pit spoil dumps to reduce the risk of unacceptable levels of As and Se release and to ensure that there is decreased risk of the material dispersing (due to its moderate sodicity). In addition, for rehabilitation purposes the dumps will:</p> <ul style="list-style-type: none"> not be placed within or on any natural watercourses; and require a soil cover designed to adequately protect the spoil from potential wind and surface water erosion, and for long-term vegetation support. <p>To reduce the risk of unacceptable As and Se release to the environment, and to ensure that the dispersiveness of the material does not increase to an unacceptable level:</p> <ul style="list-style-type: none"> dust suppression (watering) may be required during dump construction; and the final landform will incorporate soil covers and drainage works to ensure long-term stability of the soil cover. <p>The design of the landform, including the size and location of stormwater drains, will be developed as part of a Rehabilitation Plan for the site (a requirement of the existing Plan of Operations).</p> <p>Due to the possibility of displaying a PAF character, all pit floor waste scrapings will be buried deep within the in-pit spoil dumps where backfilling occurs after mining. The residual void south of the 202 m AHD contour will also fill with water, maintaining anoxic conditions on the floor of the void. The atmospheric exposure times for these materials will be kept to a minimum. Field observations and pit water quality monitoring will be implemented in order to identify the potential development of low pH conditions or ARD within the active pits. If low pH conditions are</p>



Environmental Protection And Control Strategies - Waste	
	<p>identified, water treatment, e.g. lime dosing prior to release to the surrounding environment may be required during active mining.</p> <p>The current testing program has established that some of the carbonaceous materials occurring immediately above and below the LHD Coal Seam in the Expansion Area have an increased sulphide (pyrite) content and may be PAF, however with only a relatively low capacity to generate acid. If required, the additional test work on these materials would include a sulphur assay, ANC determination and modified NAG testing on additional samples occurring within 1 m of the LHD coal seam. Such samples would be collected and analysed at six-monthly intervals, or whenever rock materials at these levels are exposed during mine operations. NB: Such testing would only need to continue in the long-term if non-systematic or unpredictable variability in the parameters of concern was found at the stratigraphic horizons of interest.</p> <p>Coarse and fine coal rejects will be recombined and disposed of in-pit at a moisture content of approximately 30 % at the existing Isaac Plains Coal Mine along with the coal and spoils from the Expansion Area. The fine coal management system will be used as an alternative fine rejects treatment method if the current system fails or if it is planned to recover good quality fine coal from the rejects flow.</p> <p>Due to the geochemical variability of the coarse and fine rejects derived from the different coal seams within the Expansion Area, further work will be carried out based on the actual recombined co-disposal material once the Expansion Area is approved and mining commences. The program includes the collection of representative samples of both coarse and fine reject material from the CHPP over a number of days. The samples collected will initially be geochemically characterised using acid-base accounting and further geochemical testing may be required for selected samples, including modified NAG testing and leach column testing. This will enable the evaluation of appropriate management strategies for the disposal and capping of the coarse and fine reject material.</p> <p>Additional geochemical testing on the coarse and fine reject materials will be undertaken to further evaluate the acid forming characteristics of the material and to evaluate appropriate management strategies.</p> <p>Ensure adequate management of PAF materials in the blended coarse and fine reject material to reduce the risk of acid generation and ARD, resulting in low pH conditions. Water quality monitoring will be conducted in water storages for pH, As, Co, Fe and Se, to determine whether acid generation and/or ARD is potentially occurring on site (refer to Section 20.6.4). Water quality monitoring will also include As, Sb and Se and Zn.</p>

Proposed EA Conditions

Proposed EA Conditions	
Waste	
D1-1	A designated area must be set aside for the segregation of economically viable, recyclable solid and liquid waste.
D1-2	Where possible and practical, vegetation waste from clearing shall be spread on rehabilitated areas. Vegetation waste only may be burnt as a last resort and only if there is minimal risk of causing nuisance to the neighbouring sensitive receptors. General waste must not be burnt or allowed to burn on the licensed site unless permitted by the administering authority.
D1-3	Records must be kept for five years, and must include the following information: (a) date of pickup of waste; (b) description of waste; (c) cross reference to relevant waste transport documentation; (d) quantity of waste; (e) origin of the waste; (f) destination of the waste; and (g) intended fate of the waste, for example, type of waste treatment, reprocessing or disposal.
D1-4	Records of trade and regulated wastes or material leaving the mining lease for recycling or disposal, including the final destination and method of treatment, must be in accordance with the Environmental Protection (Waste Management) Policy 2000.
Waste Management	
D2-1	A Waste Management Plan, in accordance with the Environmental Protection (Waste Management) Policy 2000, must be implemented and must cover: (a) describe how the Integrated Isaac Plains coal mine recognise and apply the waste management hierarchy; (b) identify characterisations of wastes generated from the project and general volume trends over the past 5 years;

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Proposed EA Conditions	
Waste	
(c)	a program for safe recycling or disposal of all wastes-reusing and recycling where possible;
(d)	waste commitments with auditable targets to reduce, reuse and recycle;
(e)	The waste management control strategies must consider: <ol style="list-style-type: none"> the type of wastes; segregation of the wastes; storage of the wastes; transport of the wastes; monitoring and reporting matters concerning the waste; emergency response planning; disposal, reused and recycling options;
(f)	identify the potential adverse and beneficial impacts of the wastes generated;
(g)	detail the hazardous characteristics of the waste generated (if any); <ol style="list-style-type: none"> cover a disposal procedure for hazardous wastes; outline the process to be implemented to allow for continuous improvement of the waste management systems; identify responsible staff (positions) for implementing, managing and reporting the Waste Management Plan; and
cover a staff awareness and induction program that encourages re-use and recycling.	
Storage of Tyres	
D3-1	Scrap tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options must be stored in stable stacks and at least 10m from any other scrap tyre storage area, or combustible or flammable material, including vegetation.
D3-2	All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.
D3-3	Where no feasible recycling or waste-to-energy options are available, disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable.
D3-4	Scrap tyres disposed within the operational land must not impede saturated aquifers and compromise the stability of the consolidated landform.

20.9 LAND

In the absence of criteria for specifying environmental values for land in the EP Act, EP Regulations and Policies, the environmental value for the land is regarded as the maintenance of the existing land suitability classification, i.e. suitability for grazing. The major potential impacts on land suitability will be the construction of surface infrastructure and mining. The Queensland Department of Minerals and Energy (1995) Environmental Policy for Mining in Queensland (Policy) states that post mining landforms should aim to return lands of similar suitability and range of land use options which existed prior to mining, or, to an agreed alternative use(s).

20.9.1 Environmental Values

20.9.1.1 Land

Elevation at the existing Isaac Plains Coal Mine site ranges between 200 m AHD and 300 m AHD and the site drains towards the Isaac River. Smoky Creek flows through the centre of the mining lease and Billy's Gully traverses near the southern boundary of ML70342. Within the Expansion Area, the local topography generally grades from the west to the east towards the Isaac River, with the topography characterised by a small ridge/plateau in the centre, running almost north-south. Topography in the Expansion Area can also be described primarily as gently undulating.

Other than works associated with the existing Isaac Plains Coal Mine, the current land use in the IIPP site is grazing, with no indication of cultivation for grain crops having been undertaken. The area was originally vegetated with mixed Brigalow and Poplar Box communities and associated grasslands but has almost been completely cleared to increase grazing capacity and for farm infrastructure including fencing, dams and water troughs.



20.9.1.2 Soils

Soil mapping units within the IIPP have been developed on the basis of similarity in morphology, laboratory data, original vegetation, soil origin and topographic position. Literature reviews were conducted and supported by field surveys.

Soils assessment in the existing Isaac Plains Coal Mine area identified a total of nine soil types including one variant, the black/brown linear gilgai complex (B1v) which occurs with B1. Smoky Creek which forms a clear soil boundary between better quality scrub soils to the north (B1 and B2) and the harder, coarser structured soils to the south (B4, B5 and B6). A small residual hill of apparently lateritic basalt occurs to the north-west.

The principal soil types are non-cracking sandy clay Brigalow on gently undulating plains, together with sandy duplex Poplar Box woodlands (E1). Hard sandy duplex alluvia with mixed Poplar Box woodland (A1 and A2) occur in association with two creek lines in the area.

The principal soil types over the Expansion Area are non-cracking sandy clay Brigalow gently undulating plains (B2) together with sandy duplex Poplar Box woodlands (E1). Deep sandy and duplex alluvia with mixed Poplar Box woodland (A1) occur in association with major alluvial lines in the area.

The soils and land suitability assessment conducted identified a total of seven major soil types, including one variant. A soil variant may possess attributes which are somewhat different from the mainstream soil attributes but either cannot be mapped out at this scale or does not constitute any significant deviation from the agricultural suitability or basic soil morphology. The variant in this survey consists of the shallower upper slopes of Ironbark occurring within the Poplar Box E1.

The assessment of soils units potentially impacted by the Expansion Area was completed before the finalisation of the alignment of the access/haul road linking the Expansion Area to the existing Isaac Plains Coal Mine. It is anticipated that soils in the area of the final alignment would be similar to those within the northern part of the study area.

20.9.2 Potential Impacts

20.9.2.1 Land

Potential impacts on land are as follows:

- contamination of land from storage and handling of fuel chemicals;
- contamination resulting from acid rock drainage;
- contamination from overburden;
- erosion – wind and water;
- change in topography, attributed to the overburden spoil dumps and final voids;
- change in vegetative communities;
- reduction in the productivity of the land for post-mining land use; and
- loss of topsoil through poor topsoil management practices.

During mining the potential for soil erosion on disturbed areas may also be increased due to:

- loss of the protective vegetative cover;
- loss of existing soil conservation works (contour banks, diversion banks, waterways);
- loss of soil structure;
- re-configuration of soil profiles upon rehabilitation; and
- differential settlement of rehabilitated areas.

Exposure of unweathered material to oxidation processes near the post-mining landform surface can result in the release of oxidation products (e.g. salts and potentially acid) which are prone to transport by surface run-off or infiltration.

Materials expand by approximately 30% when mined (i.e. spoil in a dump has a volume approximately 1.3 times that of its *in situ* or unmined volume). As a result, spoil cannot be contained within the mined



excavation leading inevitably to landforms different to those already present. The post-mining material will also have a higher initial porosity than the original in situ spoil. Some residual settlement is expected with time, but this will have little effect on the final landform. Historical evidence from open cut coal mines in the Bowen Basin indicates that instability does not largely exist on spoil dumps however some residual settlement may occur over time.

Return of a vegetation growth media to the surface of a landform that is different from that which was present near the surface prior to mining, can alter the capability of original vegetation communities to re-establish.

Spoil returned to the surface will have a poorer nutrient status, lower organic matter content and poorer structure compared to the soil hosting original vegetation communities. Poorly structured and potentially dispersible materials may be prone to erosion, particularly on slopes.

In addition, open cut mining operations have impacts on the topography of the area, attributed to the overburden spoil dumps and final voids. The spoil dumps, after controlled placement, will appear as a gently undulating plateau of unconsolidated soil and rock, on what was previously predominantly undulating lowland plains and gently sloping crest areas. Spoil dumps will be a maximum of 40 m above natural ground level as a consequence of the swell factor of 30 %.

The mine plan is such that the void on the Isaac River floodplain adjacent to the Isaac River will be backfilled at the end of mining up to the **202 m AHD contour PMF level, which is equivalent to the 1 % AEP plus 1 m.**

In terms of soil conservation and agricultural land suitability, potential impacts from mining activities are considered manageable and the proposed post-mining land use of low level grazing is considered readily achievable.

20.9.3 Environmental Protection and Control Strategies - Land

Environmental Protection Objectives And Control Strategies - Land																																		
Environmental Value	Existing soils and land capability.																																	
Environmental Protection Objective	<p>Prevent excessive clearing.</p> <p>Return disturbed land to pre-mining land suitability, where practicable, or alternative suitability subject to the agreement of the underlying landholder.</p> <p>Ensure post-mining landforms are stable so that the agreed post-mining land use is not compromised.</p> <p>Implementation of ARD monitoring program.</p>																																	
Performance Indicators/ Criteria	<p>The rehabilitation objective shall be to achieve stable landforms.</p> <p>The rehabilitation objective shall be to achieve:</p> <ul style="list-style-type: none">• self sustaining native ecosystem;• a stable landform that meets the criteria outlined below; and• landforms are stable with no visible active rill or gully erosion. <p>Sufficient quantity and quality of topsoil salvaged for rehabilitation.</p> <p>No impacts from ARD.</p> <p>Monitor rehabilitation and carry out maintenance where required.</p> <p>Install graded banks on re-contoured spoil to minimise erosion.</p> <p>Progressive rehabilitation will commence when areas become available within the operational land.</p> <p>All areas significantly disturbed by mining activities are rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with the following two tables:</p> <table><tr><th></th><th colspan="6">Disturbance type</th></tr><tr><th></th><th>Residual Voids</th><th>Waste rock dump(s)</th><th>Sediment/ Supply Dams</th><th>Infrastructure</th><th>ROM area</th><th>Road(s) and tracks</th></tr><tr><td>Projected surface area (ha)</td><td>123</td><td>241.3</td><td>183</td><td>40.1</td><td>15.6</td><td>32.14</td></tr><tr><td>Pre-mine land use</td><td>Grazing</td><td>Grazing</td><td>Grazing</td><td>Grazing</td><td>Grazing</td><td>Grazing</td></tr></table>							Disturbance type							Residual Voids	Waste rock dump(s)	Sediment/ Supply Dams	Infrastructure	ROM area	Road(s) and tracks	Projected surface area (ha)	123	241.3	183	40.1	15.6	32.14	Pre-mine land use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
	Disturbance type																																	
	Residual Voids	Waste rock dump(s)	Sediment/ Supply Dams	Infrastructure	ROM area	Road(s) and tracks																												
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Pre-mine land use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing																												

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Environmental Management Plan



Environmental Protection Objectives And Control Strategies - Land

	Post-mine land use	Water storage	Native Ecosystem	Water storage	Grazing	Grazing	Grazing or to remain as farm access upon agreement with landholder
	Post-mine land capability classification	V	V	V	IIV	II - IV	III or V
	Projective cover range (%)	N/A	70%	N/A	70%	70%	N/A
Based on conceptual design details.							
Disturbance Type		Maximum Slope Range %			Projected IIPP Surface Area (ha)		
External wall		15% (8.5°)			326		
Low wall		73% (36°)			192		
Residual voids will comply with the following:							
Void identification		Void wall –competent rock slope (%)		Void low wall – incompetent rock slope (%)		Void maximum surface area (ha)	
N1		275% (70°)		73% (36°)		12.3	
N2		275% (70°)		73% (36°)		6.9	
S1		275% (70°)		73% (36°)		1.1	
S2		275% (70°)		73% (36°)		11.9	
S3		275% (70°)		73% (36°)		4.8	
Expansion Area Mine Pit		275% (70°)		73% (36°)		86	
Control Strategies & Commitments	<p>Outer dump slopes will be designed at no greater than 16 % (also known as 1V:6H or 10°) until site specific trials indicate alternative design options. The outer pit dump slopes will have maximum slope lengths between graded banks conforming to current best practice. External slopes will drain to sedimentation dams.</p> <p>The surface of waste dumps will be shaped to mimic the original gently undulating landform to promote a self sustaining native ecosystem. Surface run-off will be directed towards appropriately lined drains.</p> <p>The low wall of the final void will remain as dumped (angle of repose) and will be benched as required. Highwall slopes in geotechnically stable ground which have not been mined will remain at their final batter angles (typically 70° based on geotechnical investigations to date) and will be made safe to ensure the safety of humans and animals.</p> <p>The coal seam in final voids will be sealed using pre-strip, if available.</p> <p>Design and install a perimeter stormwater diversion drain to divert clean water from disturbance areas.</p> <p>To minimise the risk of the Isaac River overflowing into the final void and drawdown of the alluviums, the mine plan has been redesigned to remove the void that previously ran adjacent to the Isaac River. At the end of mining, the final void on the Isaac River floodplain will be backfilled up to the level of the PMF.</p> <p>The perimeter of final voids will be fenced and appropriately signed to restrict access.</p> <p>Surface runoff from all rehabilitated areas will pass through sediment control structures to reduce the amount of final sediment loads reporting watercourses near the IIPP, i.e. Smoky Creek, and the watercourses known locally as Billy's Gully and Conrock Gully to current EA discharge levels.</p> <p>The final landform drainage system will be subject to detailed design as part of future detailed mine closure planning. Amendments to the conceptual design will be made as necessary at that time to address detailed design issues.</p> <p>The overburden emplacement will drain externally with runoff being controlled by contour ripping and contour drains. The contour drains will be standard, open cut rehabilitation contour drains constructed by cut and fill, using a grader or small bulldozer. Drain cross sections will be sized to convey runoff from the 20 year average recurrence interval (ARI) rainfall event. The drains will have a 1% grade and will have typical spacings of approximately 100 m to limit the effective contributing catchment areas.</p> <p>Drainage at the toe of the overburden dump, around the perimeter of the final landform, will be collected in a table drain. These drains will convey runoff from the overburden emplacement to the surrounding natural</p>						



Environmental Protection Objectives And Control Strategies - Land

drainage system via a series levee culverts fitted with flood gates. The flood gates will ensure the integrity of the PMF levee is maintained during any extreme flood events. Drainage from the overburden dump will be directed over the flood protection levee via lined drains designed to ensure that the levee does not erode. Standard sediment and erosion will be installed the establishment phase of final landform drainage structures. Once drainage infrastructure has established grass cover, erosion sediment controls will be decommissioned.

On behalf of IPCM, a Registered Professional Engineer of Queensland (RPEQ), will complete an assessment report on the geotechnical issues and erosivity of the proposed final landforms, including final voids, by 30 June 2010 to demonstrate long-term landform stability. Reference will be made to the Queensland Mining Guidelines (or subsequent reprints) in making this assessment.

All infrastructure constructed by or for the IIPP during the mining activities including water storage structures, will be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner/holder.

Dry reject disposal will be used to maximise the potential for water recovery as well as fine coal reject management system all encapsulated in the site water management system to minimise the potential for groundwater and surface water contamination.

The existing facilities for the prevention of land contamination and management of wastes with the potential to cause such contamination will be extended into the Expansion Area from the existing Isaac Plains Coal Mine.

Testing will be carried out to evaluate the acid forming characteristics of the coal rejects and to evaluate appropriate management strategies.

All chemicals and fuels will be appropriately stored in accordance with *AS10940 - The Storage and Handling of Flammable and Combustible Liquids*.

Explosives will be stored in accordance with the requirements of *AS2187 - Explosives Storage and Transport*.

The initial PoO for the IIPP, and subsequent updates, will provide evidence of testing or proposed testing of the spoil to be mined during the term of that plan to identify those materials having a high propensity for acid mine drainage and describe the management practices for the placement of such material to minimise the potential generation of acid mine drainage. Water quality monitoring will also be carried out as outlined in **Section 20.6.4**.

Dispersive and non-dispersive spoil will be identified to ensure the appropriate selective placement in the post mining landform. The relevant identification and selective placement procedures and, evidence of operations in accordance with those procedures, will be made available to the administering authority upon request.

Revegetation

IPCM will complete an investigation into the rehabilitation of areas of disturbance and submit a report to the administering authority proposing acceptance criteria to meet the outcomes listed above by 30 June 2010.

Disturbed land will be progressively rehabilitated as it becomes available. The rate and areas for rehabilitation will be detailed in the Plan of Operations.

IPCM is committed to the four general rehabilitation goals, i.e. that the rehabilitated landform be:

- safe to humans and wildlife;
- non-polluting;
- stable; and
- able to sustain an agreed post-mining land use.

The IPCM rehabilitation operating philosophy is based on the following concepts:

- design earthworks and revegetate to a predetermined post-mine land use;
- minimise unnecessary land disturbance;
- minimise erosion and its potential off-lease effects;
- protect downstream water quality from contaminated runoff;
- recognise and protect downstream beneficial uses (surface and groundwater); and
- on relinquishment of title, ensure the agreed post-mine land use has been reached.

All areas significantly disturbed by mining activities are rehabilitated to a stable landform with a self-sustaining vegetation cover.

IPCM will be responsible for ongoing maintenance of the post-mining landform in accordance with the mining lease conditions.

Where reasonable and practicable, areas of the site where grazing is nominated as the post mine land use must include native grass species endemic to the area.

IPCM will continue to research the most appropriate species mix of native trees, shrubs and grasses for revegetation and determine rehabilitation success criteria using on-site research program and relevant data from other mines. The program will include investigations into vegetation productivity, diversity, and soil fertility.

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Environmental Protection Objectives And Control Strategies - Land

The selection and establishment of plants will be complementary to nearby remnant vegetation.

Monitor rehabilitation and carry out maintenance where required to achieve rehabilitation success criteria.

Topsoil

A-horizon topsoil to be salvaged for rehabilitation. Topsoil stockpiles to be mapped and volume recorded. Revegetate topsoil stockpiles.

Respread topsoil on re-contoured spoil. Contour rip spoil to > 0.5 m.

Vegetation clearing and topsoil management will include the following:

- prior to disturbance, all soil to the depth of the A horizon will be stripped;
- where topsoil is being stripped within an economic (scraper haulage) distance of a prepared rehabilitation area, topsoil will be directly placed on the rehabilitation area without stockpiling. Where this will not be feasible, topsoil stockpiles will be constructed;
- the height of topsoil stockpiles will be minimised where possible given operational constraints;
- topsoil stockpiles will be left to self-revegetate. If after one or more wet seasons an unacceptable grass cover has established on the topsoil dump, the surface will be ripped and sown with pasture grasses; and
- topsoil replacement on reshaped spoil areas will occur at similar depths existing prior to mining (maximum 250 mm – A horizon depth).

Erosion Control

Excavations (borrow pits and quarries) required during mine infrastructure construction will require erosion control measures to be in place. The measures will comply with the Queensland Division of the Institution of Engineers "Soil Erosion and Sediment Control - Engineering Guidelines for Queensland 1996".

Areas to be excavated and levelled will be kept to a minimum for the required construction purpose.

Unnecessary disturbance of soil or vegetation will not occur beyond the construction area.

The time of exposure of disturbed areas will be minimised by ensuring that excavation and leveling occurs immediately prior to construction.

Diversion drains will be used to divert water away from disturbed areas.

Sedimentation traps will be erected to minimise sediment run-off from disturbed areas into waterways and surrounding areas.

Service roads will have sufficient surface drainage to prevent run-off eroding the road or adjacent areas.

Install graded banks on re-contoured spoil to minimise erosion.

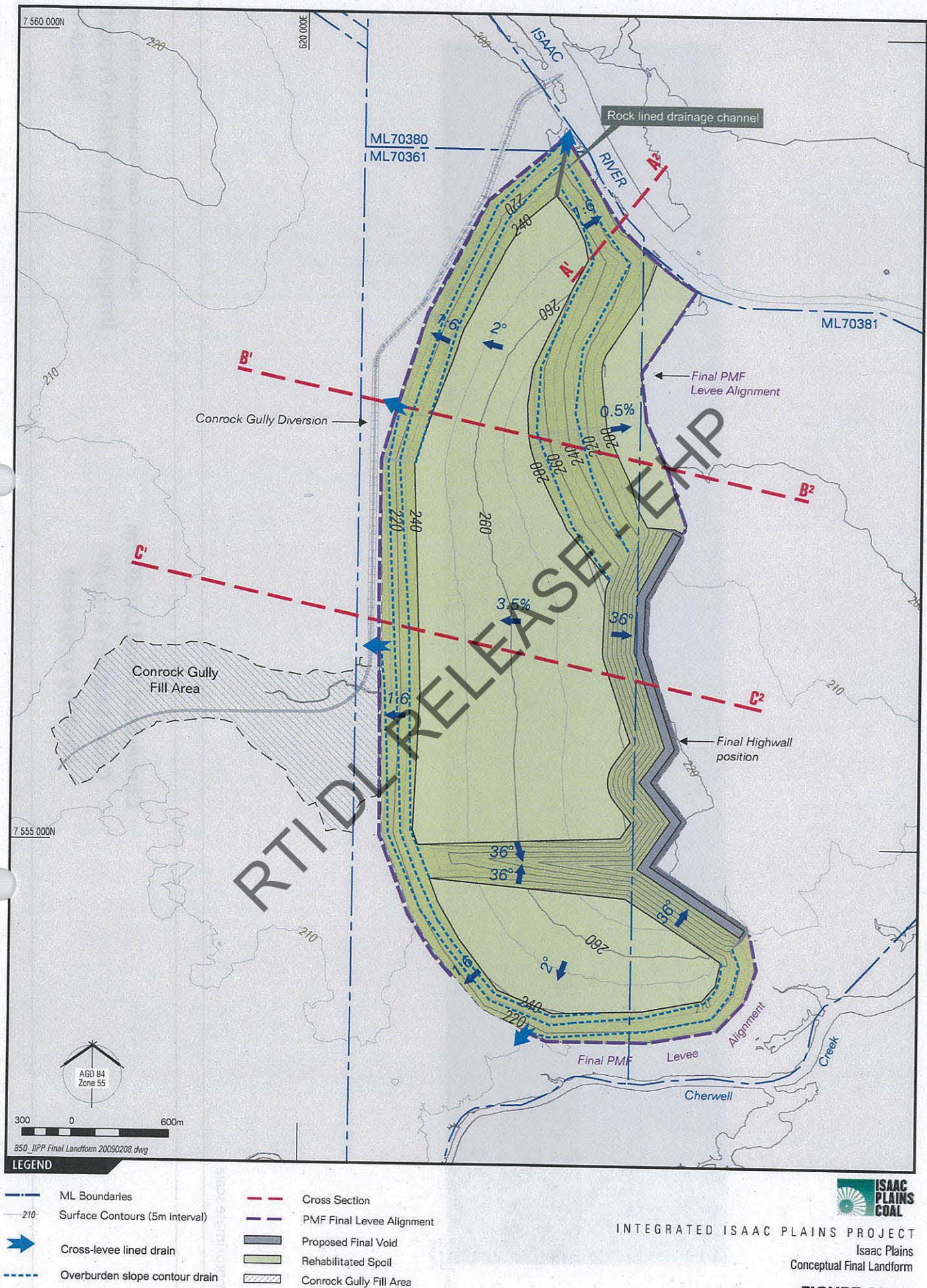
Levees will remain on-site to protect undisturbed areas from impacted areas.

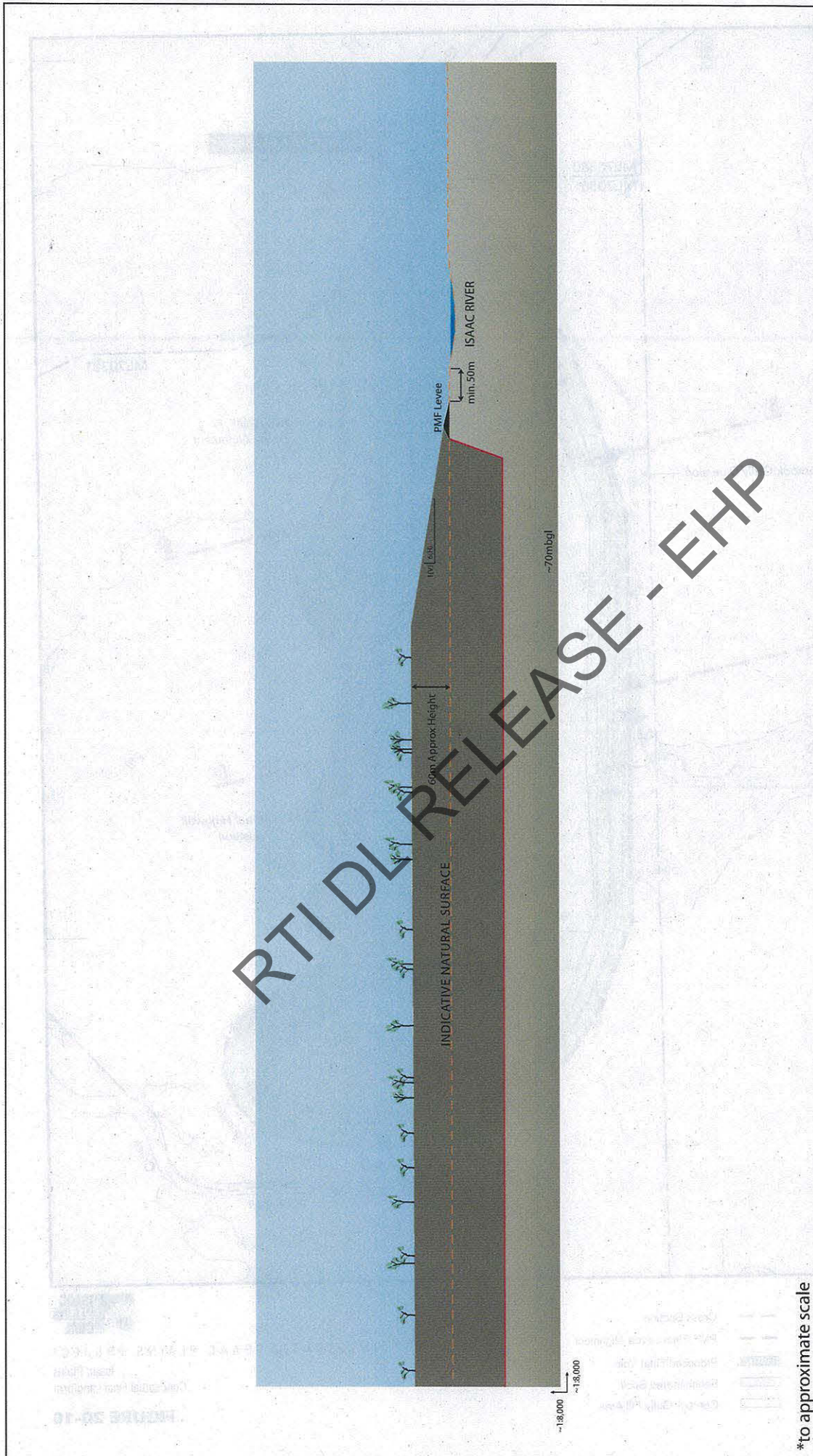
Final voids, including pits and ramps not backfilled, will be made safe and persons and stock excluded.

During the mining operations, the stability of pit and overburden dump slopes will be reviewed and designs amended as necessary.

Exploration

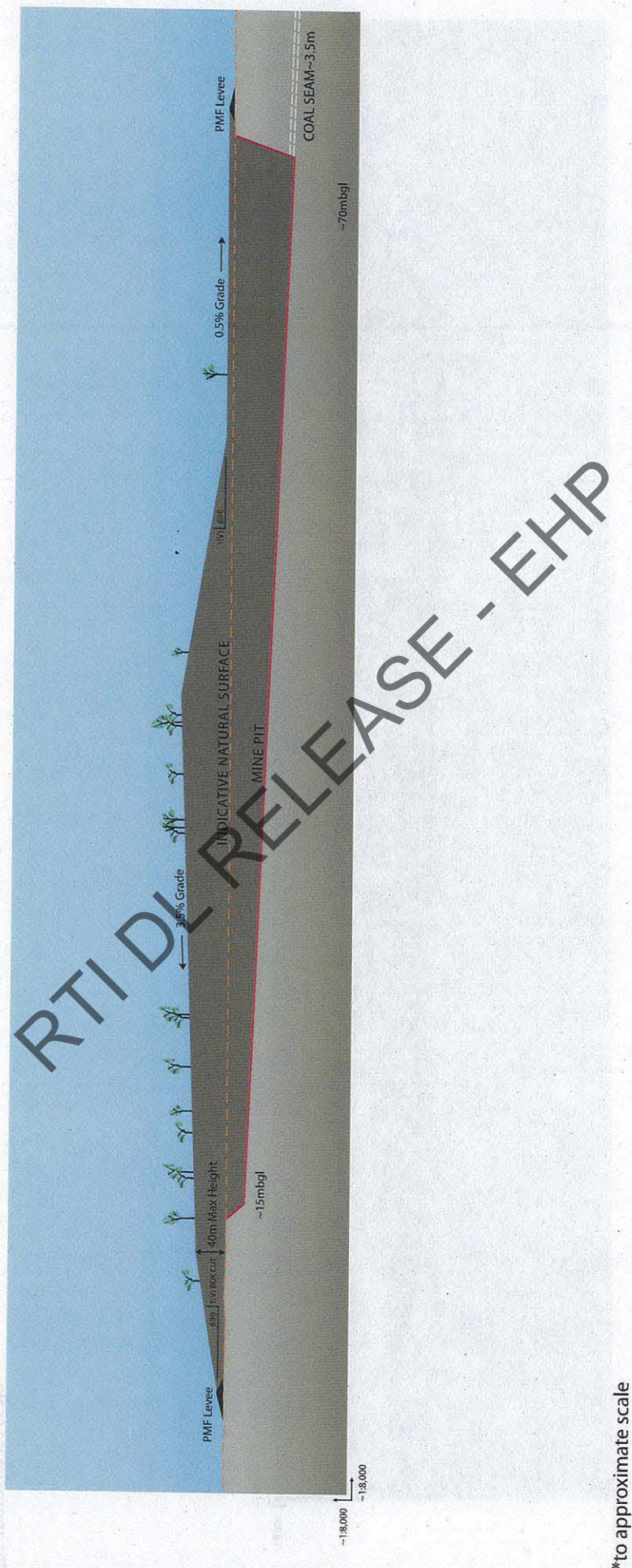
Should exploration activities be undertaken in the IIPP area in areas not authorised to be mined, they will be rehabilitated in accordance with provisions detailed in the *Code of Environmental Compliance for Exploration and Mineral Development Projects*.





Isaac Plains Coal Management Pty Ltd
Integrated Isaac Plains Project
Figure 20-17

Conceptual Final Landform
Cross Section A¹ to A²
Looking Upstream

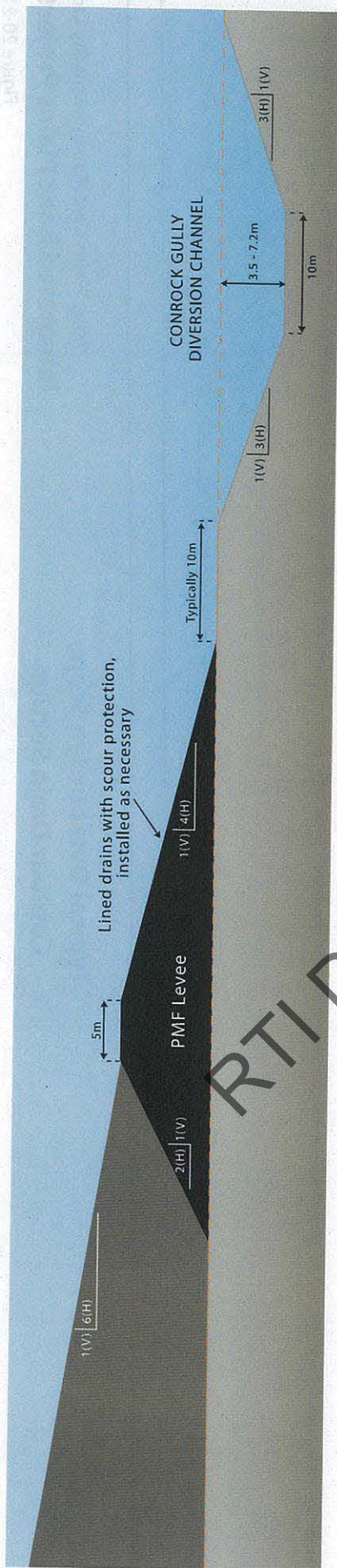




Isaac Plains Coal Management Pty Ltd
Integrated Isaac Plains Project
Figure 20-19

Conceptual Rehabilitation for Final Void
Cross Section C1 to C2 Looking Upstream

BOX CUT SPOIL LEVEE



HIGHWALL LEVEE

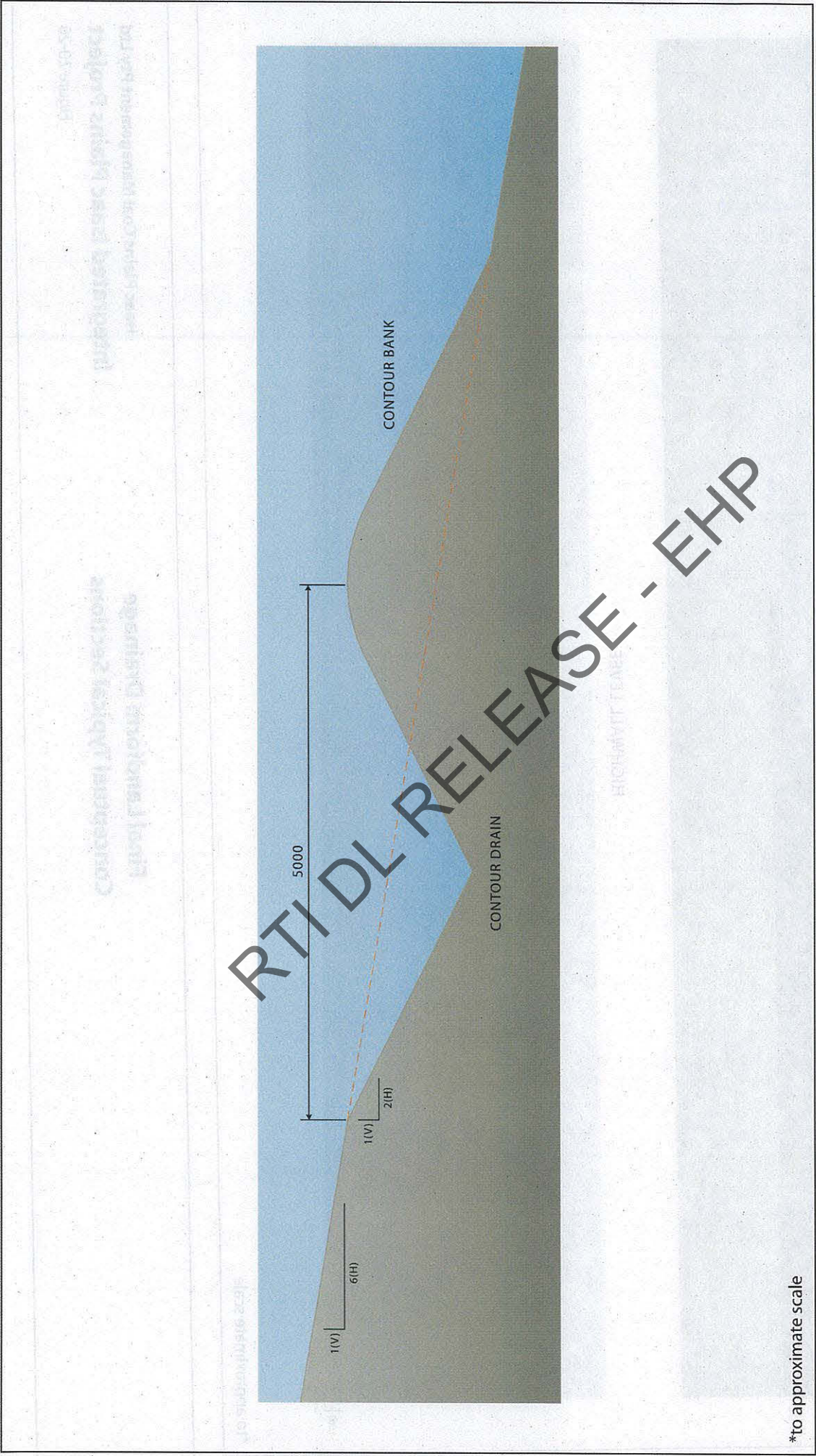


*to approximate scale

Final Landform Drainage Conceptual Typical Sections

Isaac Plains Coal Management Pty Ltd
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Figure 20-20



*to approximate scale

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Integrated Isaac Plains Project
Figure 20-21

**Typical Overburden Scope
Contour Drain Section**



Proposed EA Conditions

Proposed EA Conditions	
Rehabilitation landform Criteria	
E1-1	All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Schedule E - Table 1 (Final land use and rehabilitation approval schedule) and Schedule E - Table 2 (Landform design criteria).
E1-2	Progressive rehabilitation must commence when areas become available within the operational land.
E1-3	Complete an investigation into rehabilitation of proposed areas of disturbance and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Schedule E - Table 1 (Final land use and rehabilitation approval schedule) by 30 June 2010. Development of acceptance criteria is to consider the re-establishment of representative regional ecosystems (reference sites or another suitable alternative approved by the administering authority) and functioning habitat of areas equal to or greater than areas to be cleared and specific revegetation performance descriptors (e.g. rehabilitated areas are to display characteristics of the existing (pre-mining) regional ecosystems).
E1-4	Areas which are to be rehabilitated to native ecosystem must achieve a self sustaining native ecosystem with species composition and distribution similar to an analogue site or another suitable alternative approved by the administering authority.
E1-5	Areas to be rehabilitated must be rehabilitated to the landform design criteria defined in Schedule E - Table 2 (Landform design criteria) and the landforms must be stable.
E1-6	Where reasonable and practicable, areas of the site where grazing is nominated as the post-mine land use must include native grass species endemic to the area.
Post Closure Management Plan	
E2-1	A Post Closure Management Plan for the site must be prepared at least eighteen (18) months prior to the final coal processing on site and implemented for a nominal period of: (a) at least thirty (30) years following final coal processing on site; or (b) a shorter period if the site is proven to be geotechnically and geochemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm.
E2-2	The Post Closure Management Plan must include the following elements: (a) operation and maintenance of: i). wastewater collection and reticulation systems; ii). wastewater treatment systems; iii). the groundwater monitoring network; iv). final cover systems; and v). vegetative cover. (b) monitoring of: i). surface water quality; ii). groundwater quality; iii). seepage rates; iv). erosion rates; v). the integrity and effectiveness of final cover systems; and vi). the health and resilience of native vegetation cover.
Acid rock drainage and leachate management	
E3-1	Subject to the release limits defined in Agency Interest: Water, all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to any groundwater.
Residual Void outcome	
E4-1	Residual voids must comply with the following outcomes: (a) residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority; and (b) residual voids must comply with Schedule E - Table 3 (Residual void design).

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Proposed EA Conditions	
Infrastructure	
E5-1	All infrastructure, constructed by or for the environmental authority holder during the licensed activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner / holder.
General	
E6-1	The Environmental Management Plan and Plan of Operations must be consistent with the geotechnical and erosivity assessment (outlined in condition E6-2) within three (3) months of the completion of the assessment (outlined in condition E6-2).
E6-2	Complete an assessment report, to be undertaken by a Registered Professional Engineer of Queensland (RPEQ), of geotechnical issues and erosivity of the proposed final landforms, including final voids, by 30 June 2010 to demonstrate long-term landform stability. Reference is to be made to the Queensland Mining Guidelines (or subsequent reprints) in making this assessment.
E6-3	Cleared vegetation from the site must be managed in accordance with the following hierarchy: (a) reuse, e.g. use of logs and tree stumps as shelter for fauna in rehabilitated areas; (b) recycle, e.g. mulching of vegetation and use in rehabilitation on the site; and (c) other alternative management options implemented in a way that causes the least amount of environmental harm.
E6-4	A Weed Management Plan must be developed and implemented during the continuation of this environmental authority, and prior to the commencement of construction activities. The Weed Management Plan must describe how the weeds are to be managed in accordance with the Land Protection (Pest and Stock Route Management) Act 2002 and/or local government requirements for weeds not declared under state legislation.
Exploration	
E7-1	Disturbance due to exploration activities in areas not authorised to be mined must be rehabilitated in accordance with provisions detailed in the Code of Environmental Compliance for Exploration and Mineral Development Projects.

**Schedule E - Table 1 (Final land use and rehabilitation approval schedule)**

	Disturbance type					
	<u>Residual Voids</u>	<u>Waste rock dump(s)</u>	<u>Sediment / Supply Dams</u>	<u>Infrastructure</u>	<u>ROM area</u>	<u>Road(s) and tracks</u>
Projective surface area (ha)*	123	241.3	183	40.1	15.6	32.14
Map reference	Figures 1 & 2	Figures 1 & 2	Figures 1 & 2	Figures 1 & 2	Figures 1 & 2	Figures 1 & 2
Pre-mine land use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
Post-mine land use	Water storage	Native Ecosystem	Water storage	Grazing	Grazing	Grazing or to remain as farm access upon agreement with landholder
Post-mine land capability classification	V	V	V	IV	II - IV	III or V
Projective cover range (%)	N/a	70%	N/a	70%	70%	N/a

*based on conceptual design details

**Schedule E - Table 2 (Landform design criteria)**

Disturbance Type	Maximum Slope Range %	Projective Surface Area (ha)
Waste Rock Dump – external wall (existing IP)	15% (8.5°)	150
Waste Rock Dump – low wall (existing IP)	73% (36°)	92
Boxcut batter (existing IP)	100% (45°)	17
External Wall (Expansion Area)	15% (8.5°)	326
Low Wall (Expansion Area)	73% (36°)	192

Schedule F - Table 3 (Residual void design)

Void identification	Void wall –competent rock slope (%)	Void low wall –incompetent rock slope (%)	Void maximum surface area (ha)
N1	275% (70°)	73% (36°)	12.3
N2	275% (70°)	73% (36°)	6.9
S1	275% (70°)	73% (36°)	1.1
S2	275% (70°)	73% (36°)	11.9
S3	275% (70°)	73% (36°)	4.8
Expansion Area Mine Pit	275% (70°)	73% (36°)	26

20.10 NATURE CONSERVATION

20.10.1 Environmental Values – Terrestrial Ecology

20.10.1.1 Vegetation Communities/Flora

The majority of the areas within the IIPP to be disturbed are highly modified, i.e. cleared grazing land, providing limited habitat opportunities for native woodland fauna. These cleared areas provide habitat for some native grassland species but do not, or are unlikely to, exhibit the characteristics required for them to qualify as native grassland communities given the dominance of the introduced pasture species, Buffel Grass (*Cenchrus ciliaris*), and the low diversity of other grasses and herbs. Throughout all woodland areas, ground habitat values are diminished by the virtual monoculture of Buffel Grass and the consequent lack of floristic and structural diversity.

Remnant vegetation is restricted largely to relatively robust tracts of riparian and frontage woodland along the Isaac River and Cherwell Creek, a narrow band of riparian vegetation along Conrock Gully, and a riparian corridor along Smoky Creek which is 'of concern' (under the *Vegetation Management Act 1999* (VMA)). The limited riparian vegetation which exists along Billy's Gully is 'not of concern' (under the VMA). Remnant vegetation within the areas is in poor-moderate ecological condition with the impacts of grazing evident, i.e. reduced groundcover and shrub diversity, replacement of the native groundcover flora with Buffel Grass in most areas, and replacement of native groundcover along Isaac River with Guinea Grass.

No endangered Regional Ecosystems (REs) (including Brigalow) were found to occur in the existing Isaac Plains Coal Mine. However, two small "of concern" REs were identified along Smoky Creek.

Based on field verification, Brigalow communities are present within Expansion Area and access/haul road alignment.

20.10.1.2 Fauna

Two rare or threatened fauna species, the Squatter Pigeon (Vulnerable) and Little Pied Bat (Rare) were observed or detected within the IIPP site during fauna field assessments.



The Squatter Pigeon was observed in riparian woodland adjacent to the Isaac River and is also likely to utilise riparian and non-riparian grassy woodland habitats throughout the Expansion Area. It was also observed foraging along Billy's Gully and is expected to utilise the small alluvial pockets along Smoky Creek.

The Little Pied Bat was detected along Conrock Gully, Smoky Creek and Billy's Gully during Anabat surveys conducted as part of the riparian fauna surveys in these areas. Given the vegetation present, it is likely to also be present in the general vicinity of the Isaac River.

Based on the ecological assessments conducted and given the limited extent and poor condition of remnant habitats, the IIPP site and surrounding area is not likely to represent especially significant feeding or breeding habitat for any of the migratory or other EPBC listed species regarded as likely or possible inhabitants.

20.10.1.3 Weeds/Animal Pests

Environmental weeds including introduced pasture species are abundant in the remnant vegetation areas and have displaced natural ground cover species within the IIPP area. Buffel Grass (*Cenchrus spp.*) is particularly widespread being the main pasture species established in the area. Throughout the entire IIPP, ground habitat values have been diminished by the virtual monoculture of Buffel Grass and the consequent lack of floristic and structural diversity as previously discussed.

Three declared plant species under the *Land Protection (Pest and Stock Route Management) Act 2002* (LPA) were detected in the IIPP area, including Parthenium (*Parthenium hysterophorus*) which is widespread throughout the IIPP area. A list of all pest plants occurring in the IIPP area is provided in **Table 20-7**.

Table 20-5 Declared Pest Plant Species Occurring in the IIPP Area

Scientific Name	Common Name	Pest Status under LPA	Belyando Shire Council Status	Nebo Shire Council Status
<i>P. hysterophorus</i>	Parthenium weed	C2	Control Target	Medium Priority
<i>Harrisia</i> sp.	Harrisia Cactus	C2	Control Target	Medium Priority
<i>Opuntia</i> sp.	Prickly Pear	C2	Not listed	Medium Priority
<i>Acacia nilotica</i>	Prickly Acacia	C2	Eradication Target	High Priority
<i>Xanthium pungens</i>	Noogoora burr	N/A	C2	Medium Priority

Noogoora Burr (*Xanthium pungens*) and Prickly Acacia (*Acacia nilotica*) also occur sporadically along the waterways of the IIPP. Although the Noogoora Burr is not a declared species under the LPA as a pest species, it is listed under the Nebo and Belyando local government control requirements.



The Belyando Shire Pest Management Plan 2005-2009 (which was prepared under the requirements of the LPA) classifies weed species as either eradication target species or control target species. The Nebo Shire Pest Management Plan 2005-2009, also developed in line with the LPA, classifies weed species as particular priority species with specific levels of control for each listed species. In both Shires, eradication of target species must be destroyed wherever they occur and control targets will be removed from strategic areas in a phased control program. **Table 20-7** lists those species identified in the IIPP area, pest status under the LPA and local council status. The Belyando and Nebo Shire Councils, in consultation with landholders, develops property pest management plans for their specific areas/properties.

Five introduced fauna species are found in the IIPP Area:

- Feral Cat (*Felis catus*), listed as a Class 2 pest under the LPA;
- Feral Pig (*Sus scrofa*); listed as a Class 2 pest under the LPA;
- European Rabbit (domestic and wild breeds) (*Oryctolagus cuniculus*), listed as a Class 2 pest under the LPA;
- Cane Toad (*Bufo marinus*), not a declared pest in Queensland ; and
- Brown Hare (*Lepus capensis*), not a declared pest in Queensland.

Although not observed during the most recent field surveys conducted in the Expansion Area, observations of both Wild Dog/Dingo (*Canis familiaris*), listed as a Class 2 pest under the LPA, and the House Mouse (*Mus musculus*), not a declared species in Queensland, have been made in the IIPP area. All of the above listed species are commonly encountered throughout the Central Highlands area. Both the Nebo and Belyando Pest Management Plans address Class 2 pests. The Plans provide a legal and administrative framework for the enforcement and removal of declared animals from private property. As for weed control, Councils, in consultation with landholders, develop property pest management plans for their specific areas/properties.

20.10.2 Potential Impacts – Terrestrial Ecology

Potential impacts of the IIPP on flora and fauna are associated with:

- disturbance of remnant vegetation and/or habitats for the construction of mine infrastructure and as a result of mining activities;
- clearing of endangered Brigalow REs 11.3.1 and 11.4.9;
- removal of riparian corridor vegetation as part of watercourse diversion to access the coal reserves beneath Smoky Creek and Conrock Gully;
- construction of a levee in the Expansion Area;
- translocation of weeds;
- infestation of animal pests;
- noise;
- lighting;
- vehicle collisions with fauna;
- cable crossings of watercourses;
- aquatic continuity in watercourses;
- hydrology and water quality changes in watercourses; and
- impacts on rare, threatened or migratory species, populations and communities.

No direct impacts on fauna at the IIPP site are anticipated.

Given the minimal proposed disturbance to remnant habitats, the poor condition of habitats within the proposed extent of disturbance for the IIPP, and the area of disturbance compared to available habitats in the study region, it is not anticipated that the IIPP will lead to significant impacts on rare, threatened or migratory species, communities or populations listed under the NCA or EPBC Act.



20.10.3 Environmental Values – Aquatic Ecology

The waterways within the IIPP area are typical of small temporary streams in central Queensland. Temporary streams are those driven by a climate characterised by a lengthy dry period followed by a shorter wet period. Streams dry up and surface waters disappear during the dry periods only to reappear with associated biological communities following the onset of the next substantial rains. Ephemeral waters are a subset of temporary waters that contain water only after irregular rainfall or flow events. The defining features of these temporary waterways are the aridity of the environment, alternating with high energy flow in storm events. The aridity also makes them prone to degradation.

The waterways within the IIPP area generally flow for only a few hours after rain. They are often survived by small surface pools which may remain for up to a few weeks at a time. The aquatic ecology in these systems are driven by the short periods of time that they contain water.

The gullies and water bodies examined in this study area are identified as ephemeral waterways. These waterways typically flow for short periods following rainfall events.

The aquatic habitats within the waterways are in reasonable condition, although some had been subject to disturbance from land use practices, particularly damage to bank structure and stability where unrestricted cattle had access to the surviving pool environments. The presence of cattle in the water bodies can result in disturbance to the aquatic environment through physical alteration of the channel.

Such waterholes, whilst not permanent, provided temporary refuge for remaining aquatic fauna such as fish. Although fish and macroinvertebrates were recorded from the study sites, none of these aquatic species recorded during this survey, were listed under the EPBC Act, NCA or Fisheries Act 1994.

No aquatic flora (macrophytes), turtles or platypus were observed during the study. The absence of macrophyte communities is not unexpected amongst water bodies with ephemeral flow and naturally turbid waters.

20.10.4 Potential Impacts – Aquatic Ecology

Potential impacts of the IIPP on aquatic ecology are associated with:

- erosion and sedimentation from land disturbing activities such as road and other mine infrastructure construction and mining operations;
- the diversion of Smoky Creek and Conrock Gully which will involve the removal of these water channels and their associated riparian zone; and
- potential for chemical and fuel spills.

20.10.5 Environmental Protection Objectives and Control Strategies – Nature Conservation

Environmental Protection Objectives And Control Strategies - Nature Conservation	
Environmental Value	Integrity of the natural ecosystems and conservation values for flora and fauna are to be protected.
Environmental Protection Objective	Confine clearing of habitat of rare and vulnerable species to that essential for the mine. Ensure there are no adverse impacts the local waterways.
Performance Indicators/Criteria	Extent of clearing. Water quality characteristics in local waterways. Extent of clearing does not exceed that set out in the project plan. Weed management in accordance with Land Protection (Pest and Stock Route Management) Act 2002 and local Government requirements.
Control Strategies & Commitments	Restrict clearing of all vegetation areas to that essential for the project, i.e. no clearing of remnant vegetation beyond that needed to safely and efficiently operate the mine site. Vegetation cleared from the site will be managed in accordance with the following hierarchy: a) reuse, e.g. use of logs and tree stumps as shelter for fauna in rehabilitated areas; b) recycle, e.g. mulching of vegetation and use in rehabilitation on the site; and c) other alternative management options implemented in a way that causes the least amount of environmental harm.



Environmental Protection Objectives And Control Strategies - Nature Conservation	
	<p>Preferential use of non-remnant areas and 'not of concern' remnant vegetation areas where possible prior to disturbing any areas of remnant vegetation.</p> <p>The extent of disturbance to the riparian corridor will be considered in selecting the final location for the Isaac River low level crossing to minimise disturbance.</p> <p>The low level crossing of the Isaac River will be oriented as near to perpendicular as practicable to the stream channel to minimise vegetation disturbance. Riparian vegetation will be left as close as possible either side of the crossing, with lateral branches of adjacent trees that may impinge on the crossing being routinely lopped to maintain clear passage rather than total removal of the trees.</p> <p>Designing of the out-of-pit spoil dump to avoid or minimise the disturbance of the area of Brigalow and RE 11.3.2 adjacent to Cherwell Creek.</p> <p>Fencing off an area of land (equivalent to the area of Brigalow to be disturbed) not required for mining to allow for the natural regeneration of Brigalow. Dependant on the location of this area consent may be required from the landowner prior to implementation of this strategy.</p> <p>On an annual basis, areas of vegetation within the mine to be cleared, (including significant vegetation communities), will be identified and detailed with maps, in the PoO.</p> <p>Areas of remnant vegetation (approximately 67.7 ha) that are proposed to be cleared as part of the IIPP will be offset in accordance with the requirements of the DNRW document <i>Policy for Vegetation Management Offsets</i>, 28 September 2007. IPCM is committed to providing an offset of 67.7 ha of remnant vegetation, with the required offset designed to:</p> <ul style="list-style-type: none">1. maintain ecological processes at a subregional level, including interrelationships of natural values, species distributions and movements;2. be geographically close to the areas proposed to be cleared as is reasonably achievable ensuring that localised environmental affects of clearing are mitigated and ecological equivalence achieved;3. recreate similar habitats to the surrounding area; and4. be a pre-clearing regional ecosystem that has the same or higher conservation value as the area proposed to be cleared and should ideally be on the same land zone as the regional ecosystem(s) being cleared. <p>The offset area will be an area that is large enough to be mapped as remnant vegetation in accordance with the current version of the EPA's "Methodology for Survey and mapping of Regional Ecosystems and Vegetation Communities in Queensland" and will be developed to become ecologically equivalent to the area being cleared.</p> <p>As part of the application for the proposed offset covenant, IPCM will develop and submit a management plan which will specify how the offset will be managed to ensure the offset achieves or maintains remnant regional ecosystems status and ecological equivalence. As part of the management plan, IPCM will commit to ensuring the offset is legally secured for the life of the IIPP and for protection, and management as required during operations and post-mining. Post-mining management decisions will include consultation with landholders.</p> <p>IPCM will organise to meet formally with the DNRW Vegetation Management Officers in the relevant district to discuss offset requirements prior to making a formal covenant application. This will be conducted prior to an application being formally submitted. In addition, IPCM will ensure that it has offset covenant approval prior to works commencing for the IIPP.</p> <p>IPCM are committed to managing the proposed buffer area located between the Isaac River and the proposed levee at the northern end of the Expansion Area in accordance with the following management measures:</p> <ul style="list-style-type: none">a) the buffer will be maintained as a vegetated area. Revegetation of this area will assist with connectivity and assist with sediment control and protect the water quality of the Isaac River. Prior to the revegetation of the levee, it is proposed to fence off the area and allow for natural regeneration. Should regeneration not be naturally forthcoming, using the results of soil/substrate assessment, direct seeding etc will be implemented in accordance with the substrate/soil types in the buffer area and consistent with the vegetation on the northern side of the river;b) establishment of vegetation on the levee wall. It is proposed to establish predominantly 'spreader type' grasses rather than bladed grass which will proved better stabilisation and dissipate the energy of rainfall which can lead to erosion. Specific species will be determined based on the substrate used in levee construction. No tress or shrubs will be planted on the levee. Although it will not intentionally be seeded, it is likely that in this region, buffel grass will compete with and dominate most native species. Local fauna species such as the squatter pigeon have adapted to foreign species such as buffel grass;c) both the buffer area and the levee will be fenced off from grazing impacts for the life of mine;d) the buffer area and levee will be included into the weed monitoring program for the ML areas within the Expansion Area; ande) no mine roads/access roads will be located within the buffer area.

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Environmental Protection Objectives And Control Strategies - Nature Conservation

Fauna

Do not instantly exclude native wildlife from water supplies on which they have become dependant.

Limit vehicle speed around the surface area of the mine site.

Low speed limit zones will be established and enforced for vehicle crossings of waterways in order to enhance the driver's abilities to detect crossing fauna and aid in avoiding collisions.

Lighting will be installed in such a way as to avoid direct illumination of riparian and woodland habitat areas, or where necessary, shading devices will be fitted to lights to restrict illumination of these areas.

Levees located between pits and waterways will provide some attenuation of noise generated by mining to riparian areas which may provide habitat to fauna.

The water management system for the IIPP has been designed to capture, contain and treat mine water ensuring that impacts on downstream beneficial water uses are minimised, including use by fauna.

Isaac River low level crossing will be constructed so as not to represent a passage barrier for fish and other aquatic fauna; there should be unrestricted flow through the crossing during both low and high flow events.

Provisions will be made for the safe movement of fauna in the vicinity of the low level crossing of the Isaac River. This includes the provision of 'dry culverts' or pipe/box culvert structures, and/or the erection of fencing along the margin of the riparian corridor in the vicinity of the crossing to direct fauna into the safe passage area and prevent fauna crossing the road. As part of the detailed design of the low level crossing, flood studies will be assessed to ensure that appropriate fauna passageways are provided.

The water management system for the IIPP has been designed to capture, contain and treat mine water ensuring that impacts on downstream beneficial water uses are minimised, including use by fauna.

In order to prevent bird injury and mortality, any aerial cables strung across the riparian corridors will be fitted with bird flight diverter devices at spacings which satisfy the manufacturer's application recommendations, as required.

Best practise erosion control measures will be incorporated into design and maintenance for both the construction and operation of the diversions to ensure minimal impact to downstream aquatic communities occurs from potential sedimentation resulting from surface water run-off.

Best practise erosion control measures and bunding of fuels, oils and other potential contaminants will be implemented and maintained during both the construction the operational phases, especially works near waterways and drainage lines to ensure minimal impacts to downstream aquatic communities.

Weeds

A weed management plan will be developed for the site by June 2010.

Weeds will be controlled in all areas of the site targeting species declared under legislation in accordance with the requirements of that legislation.

Weeds will be controlled in all areas of the site targeting species declared under legislation in accordance with the *Land Protection (Pest and Stock Route Management) Act 2002* and local Government requirements.

IPCM are committed to adhering to the weed management requirements of both the Belyando Shire Pest Management Plan 2005-2009 and the Nebo Shire Pest Management Plan 2005-2009.

Induction programs for site personnel on nature conservation and weed control issues.

All personnel shall report sightings of weeds, known declared plants (noxious weeds) or plants that appear out of place as an environmental incident. An environmental professional will determine whether or not the plant is a declared plant and take appropriate action, conforming to legislation where necessary. Populations of new weeds shall then be mapped and monitored to ensure they are not spreading.

All vehicles and equipment brought onto site will be thoroughly washed down prior to arriving at site to ensure all soil and plant matter has been removed.

Confirmation, in writing from the equipment provider, that all construction equipment to be used on site is washed-down and free of weed seed prior to mobilisation to the site. A movement protocol will also be developed for vehicles and plant to ensure declared weeds are not spread.

Where practicable, source external materials, e.g. sand, soil, from sites known to be free of declared and significant environmental weed infestations. NB: Parthenium is very widespread in the Moranbah district and therefore it will be very difficult to source such materials from that area.

Should a declared species be identified on the site, a management plan will immediately be developed for operations in the specific areas of infestation. This may include:

- surveying and identifying the weed species present;
- developing management procedures and practices in accordance with recommendations from the DNRW, including reference to the Pestfact information sheet series;
- controlling the weeds currently infesting the area by implementing the management

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Environmental Protection Objectives And Control Strategies - Nature Conservation

	<p>procedures and practices;</p> <ul style="list-style-type: none"> preventing the weeds from setting seed by implementing the management procedures and practices; reducing the spread of seeds and vegetative matter by implementing the management procedures and practices; and appropriate liaison with local councils. <p>Controls for areas of weed infestation may include:</p> <ul style="list-style-type: none"> mechanical means for which there are numerous options depending on the species and site geomorphology; hand grubbing or other labour intensive activities; chemicals of which there are numerous types that can be selected from to target species; and biological control measures can also be utilised such as summer rust (<i>Puccinia melampodii</i>) for Parthenium. <p>The use of chemicals for control will be minimised where appropriate in favour of mechanical or biological control methods.</p> <p>Any chemicals used close to waterways will have a high degree of biodegradability and low toxicity in this environment.</p> <p>IPCM is committed to adhering to the requirements of both the Belyando Shire Pest Management Plan 2005-2009 and the Nebo Shire Pest Management Plan 2005-2009 in order to further enhance the control and eradication of feral animals within the IIPP site and Nebo and Belyando shires as a whole.</p> <p>IPCM, in consultation with landholders and Councils, will develop a property pest management plan for the MLs.</p> <p>Feral animal control programs will be conducted as required.</p>
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20.10.6 Proposed EA Conditions

Proposed EA Conditions	
Environmental Offsets	
I1-1	The environmental authority holder must develop and submit to the administering authority within twelve (12) months of issue of this environmental authority an offsets package in accordance with the Queensland Government Environmental Offsets Policy 2008 (QGEOP) specific issue policy for vegetation management titled, "Policy for Vegetation Management Offsets, September 2007, Department of Natural Resources and Water" (or any other relevant specific issue offsets policy prepared under the QGEOP framework) to offset the loss of 68ha of remnant vegetation required to be cleared for the IIPP.
I1-2	<p><u>As a minimum requirement the offsets package must include the following:</u></p> <p>(a) <u>a proposed ecologically equivalent vegetation community to be managed and/or rehabilitated in perpetuity;</u></p> <p>(b) <u>agreement and commitment of parties to implement the offset package;</u></p> <p>(c) <u>a management plan including a map of the boundary of the proposed offset, environmental objectives, performance criteria, monitoring, reporting, corrective action, and responsibility and timing for permanent protection and management including control of weeds, cattle, site access, erosion and sedimentation and fire management.</u></p>

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20.11 COMMUNITY

Community consultation and feedback will occur as needed to inform the community about the project and to assist with community understanding of the opportunities and constraints presented by the operation of the IPCM. Community consultation and community feedback is an important part of any environmental management plan, not just because the community is part of the environment but also because they can add sensitivities and information invaluable to achieving environmental management.

All complaints associated with the IPCM will be directed to IPCM Compliance Superintendent.

20.11.1 Environmental Protection Objectives and Control Strategies – Community Consultation

Environmental Protection Objectives And Control Strategies - Community Consultation	
Environmental Value	Community interaction, open and friendly neighbourhoods with community kinship values, quietness and the high level of safety.



Environmental Protection Objectives And Control Strategies - Community Consultation	
Environmental Protection Objective	Maintain the current living standard in the vicinity of the project. Maintain or improve the current quality of the environment in the vicinity of the project.
Performance Indicators/Criteria	Number of complaints lodged by the public. All complaints received responded to within 48 hours. Number of incidents in one month.
Control Strategies	The established complaints/incidents investigation and recording system at IPCM will be adhered to. A complaints/incidents register will also be maintained for complaints about activities associated with the IPCM. The following records are required to be kept in a Complaints/Incidents Register for the project in the event of an incident or complaint: <ul style="list-style-type: none">time, date and nature of the incident/complaint;type of communication (for complaints only, e.g. telephone, letter, in person, etc.);name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then 'Not Identified' is to be recorded);response and investigation undertaken as a result of the incident/complaint;name of person responsible for investigating the incident/complaint; andcorrective action taken as a result of the incident/complaint investigation and signature of responsible person.

20.11.2 Proposed EA Conditions

Proposed EA Conditions	
Complaint Response	
F1-1	All complaints received must be recorded including details of complainant, reasons for the complaint, investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.

20.12 VISUAL AMENITY

The environmental value to be maintained in this area is the preservation of the area's visual amenity.

The term landscape assessment describes the fabric, character and quality of the surrounding area, whereas the term visual assessment relates to the changes that arise in the composition of the available views as a result of changes to the landscape, to people's responses to the changes, and to the overall effects with respect to visual amenity or aesthetic condition.

The characterisation of the IIPP area and its immediate surroundings has been based on an assessment of natural, cultural, social, aesthetic and perceptual factors as they exist today and are predicted following completion of proposed mining and post-mining rehabilitation activities.

20.12.1 Environmental Values

The IIPP area is bounded on all sides by grazing land, with grazing also continuing to be undertaken over part of the existing Isaac Plains Coal Mine site during mining. The region contains rich thermal and metallurgical coal resources, with a number of open cut mining ventures being located within a distance of 20 km, including the Peak Downs, Broadlea, Carborough Downs, Millennium, Poitrel and Moorvale mines.

The IIPP area comprises undulating rural land with isolated rocky knolls and is dissected by the Isaac River and its tributaries. The site has been extensively cleared for cattle grazing but also retains areas of remnant native vegetation, particularly riparian vegetation along creeks.

20.12.2 Potential Impacts

Due to the extent and nature of the development the visual elements that have the potential to impact on the visual amenity of the surrounding area include:

- open cut pits;
- additional ROM coal stockpiles, temporary stockpiling for coal destined for existing CHPP;
- CHPP;
- rail load out facility;

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- mine infrastructure area;
- Peak Down's Highway underpass;
- out-of-pit spoil dumps (to an average height of 30 m – maximum 40 m) at the western margin of the proposed pit outlines;
- access/haul roads; and
- site restoration.

Lighting at night is likely to be noticeable from a limited number of viewpoints. The lighting associated with the IIPP infrastructure is likely to comprise:

- elevated flood lighting above the ROM coal stockpiles;
- flood lighting for active operational areas, e.g. dragline and excavator sites;
- elevated flood lighting in the vicinity of the active spoil dumps;
- along the truck access/haul road; and
- vehicle lights.

The post-mining rehabilitation objective is to rehabilitate the land to a stable undulating landform with self-sustaining native vegetation cover. Total residual disturbance is likely to comprise out-of-spoil dumps and final voids.

Potential impacts on visual amenity are as follows:

- change of visual quality of the surrounding environment and its compatibility/discord with the landscape and surrounding use;
- visual intrusion;
- visibility;
- visual exposure (lighting impact); and
- cumulative visual impact.

There are no formal guidelines for the assessment of visual amenity impacts in Australia with the exception of the assessment of lighting impacts.

Australian Standard *AS 4282 1997 "Control of the obtrusive effects of outdoor lighting"*, provides a common basis for assessment of the likely environmental effects of developments that involve the provision of outdoor lighting. AS 4282 addresses several aspects of potential obtrusiveness, namely the light falling on surrounding properties, the brightness of luminaries in the field of view of nearby residents, the glare to users of adjacent transport systems and the effects on astronomical observations. In order to control these potential effects, the following parameters require consideration:

- a) the existing lighting level in the area;
- b) the times that the proposed lighting will operate;
- c) the type of lighting technology available to light the activity; and
- d) the use of readily available and easily understood technical data on the lighting installations which can be verified at the design and assessment stages.

20.12.3 Environmental Protection Objectives and Control Strategies – Visual Amenity

Environmental Protection Objectives And Control Strategies - Visual Amenity	
Environmental Value	Existing visual amenity.
Environmental Protection Objective	To take all reasonable and practical measures to avoid or minimise impacts on visual amenity.
Performance Indicators/ Criteria	Number of community complaints regarding impacts on visual amenity. Criteria specified in <i>AS 4282 1997 Control of the obtrusive effects of outdoor lighting</i> .
Control Strategies &	Use of high pressure sodium lights will be used where possible.



Environmental Protection Objectives And Control Strategies - Visual Amenity	
Commitments	<p>Establish buffer vegetation between new surface infrastructure and sensitive receptors.</p> <p>Vegetation regrowth beside the access/haul road or a deliberately planted vegetative barrier will be established to reduce visual impacts.</p> <p>Retain the existing vegetation on site where possible.</p> <p>Floodlights require a screen or louver attached (or close) to the light fitting to control light flux for all angles above 10 degrees below the horizontal effectively reflecting light onto the ground and improving lighting levels. The use of louvers may also allow for a lower energy rated globe to be used with ongoing energy and cost savings.</p> <p>IPCM will establish tall vegetation around dust generating areas within the IIPP to encourage dust fallout which will also provide a more aesthetic environment.</p> <p>Additional infrastructure required for the Expansion Area, where visible (e.g. ROM coal stockpile, access/haul road), will be of similar nature to that which is already present at the existing Isaac Plains Coal Mine.</p> <p>Open cut pit and the out-of-pit spoil dumps will be consistent with the existing undulating landform.</p> <p>The post-closure rehabilitated landform of the out-of-pit spoil dumps will be covered with self-sustaining native vegetation and therefore is unlikely to be obtrusive within the undulating landscape.</p> <p>Infrastructure will be removed at the completion of mining, unless agreed with the landowner.</p> <p>Complaints will be investigated expeditiously to determine the source of the nuisance light and where appropriate, an assessment will be conducted at the affected residence and residents informed of the outcome.</p> <p>Complaints will be recorded on a register at the IPCM site in accordance with the site EA requirements.</p> <p>Should the assessment determine that lighting is persistently causing nuisance, IPCM will seek to reach an agreement with the resident to provide ameliorative treatment of the dwelling to minimise the nuisance.</p>

20.13 CULTURAL HERITAGE

20.13.1 Environmental Values

The environmental values to be protected are the Aboriginal cultural heritage and the historic non-indigenous heritage.

Under the *Aboriginal Cultural Heritage Act 2003* (ACH Act), IPCM have a duty of care to take all reasonable and practicable measures to avoid or minimise impacts on aboriginal cultural heritage. Typically, a duty of care under the ACH Act can be demonstrated through undertaking a cultural heritage survey and developing a cultural heritage management plan (CHMP) or agreement in consultation with the Traditional Owners.

A cultural heritage study was undertaken over the area of the existing Isaac Plains Coal Mine during the preparation of the approved Environmental Management Overview Strategy (EMOS) for the site. Although not legally required, a cultural heritage management plan (CHMP) was developed and executed by IPCM and the Barada Bama Kabalbara and Yetimarla People (BBKY), however, is not formally registered in accordance with the ACH Act.

Following discussions with the relevant Traditional Owners for the Expansion Area, a cultural heritage study of the Expansion Area and areas of planned disturbance in ML70342 not previously assessed has been undertaken in November 2006, i.e. Smoky Creek and Billy's Gully. The current ML ML70342 has been completely surveyed by BBKY and areas due for disturbance by mining have had all artefacts salvaged and placed in designated "cultural heritage retention areas" located on the mine site.

The existing CHMP will be amended as required in accordance with the findings of this assessment. The CHMP will outline the measures to be taken to describe and protect indigenous and non-indigenous cultural heritage sites and places, and their values. Studies have been undertaken in accordance with the ACH Act.

The implementation of a CHMP will ensure that items of cultural heritage significance, should they be found to exist, will not be disturbed or removed without approval.



20.13.1.1 Indigenous Heritage

A search of the DNRW Cultural Heritage database revealed five Aboriginal cultural heritage places containing various artefacts. **Table 20-8** presents the artefact type and location.

Table 20-6 Cultural Heritage Aboriginal Cultural Heritage Sites

Attribute	Latitude	Longitude
Tree	-21.99545	148.08317
Artefact	-21.97353	148.11981
Artefact	-21.85317	148.15157
Silcrete Flake	-21.84943	148.19394
Silcrete Core	-21.85513	148.20298

20.13.1.2 Non-Indigenous Heritage

A search of the Department of the Environment, Water, Heritage and the Arts (DEWHA) Australian Heritage Register and a search of the EPA Queensland Heritage Register did not list any heritage areas of interest within either ML70342 or the Expansion Area.

20.13.2 Potential Impacts

The potential impacts from direct disturbance as a consequence of the IIPP are high as the Expansion Area, access/haul road and diversions will involve the disturbance of additional land.

20.13.3 Environmental Protection Objectives and Control Strategies – Cultural Heritage

Environmental Protection Objectives And Control Strategies - Cultural Heritage	
Environmental Value	Items of indigenous and non- indigenous heritage.
Environmental Protection Objective	To take all reasonable and practicable measures to avoid or minimise the potential for impact on indigenous and non-indigenous heritage. Maintain appropriate communication protocols with Traditional Owners.
Performance Indicators/Criteria	Implementation of the CHMP in co-operation with Traditional Owner representatives. Protocols set out in CHMP and CHIMA for site surveys, site evaluation, salvage and safekeeping, restriction of access, and communication with Traditional Owners. Permit requirements under the ACH Act.
Control Strategies	BBKY have approved the removal of the affected artefacts from along Smoky Creek to be relocated to another cultural heritage retention area. Continued liaison will occur with the BBKY under the CHMP in relation to management of these items and those remaining within the IIPP. The implementation of a CHMP and CHIMA as outlined above will ensure that items of cultural heritage significance, should they be found to exist, will not be disturbed or removed without approval. Should any new items/areas of cultural heritage or indigenous value are identified and not removed from site, such items/areas will be clearly marked on site plans indicating surface features. A register of new items/areas of cultural, heritage or indigenous value shall be maintained and contain information about the artefact, the date discovered and its location. Supplement existing archaeological surveys where necessary. Identify any restricted areas to protect indigenous and non-indigenous heritage on site plans. Prevent unauthorised disturbance of sites by warning signage or fencing. Inductions to include indigenous and non-indigenous heritage protection.
Commitments	Cultural heritage matters will be managed in accordance with the site CHMP. The site CHMP will identify cultural heritage areas that have access restrictions. Workplace procedures that respond to the discovery of previously unrecorded cultural, heritage or indigenous sites located during mining operations will be developed and implemented during the continuation of this authority and prior to the commencement of construction and future exploration activities.



20.14 TRANSPORT

20.14.1 Environmental Values

Use of public roads in the vicinity of the IIPP.

20.14.2 Potential Impacts and Mitigation Measures

Mine shift workers will be transported to the IIPP site by bus from their camp accommodation as will the majority of contractors during the construction phase. The use of the bus to transport shift workers is intended to reduce the risk of fatigued drivers on the road.

An estimated 200 light vehicles (composed of staff and visitor trips) will enter and exit (i.e. sum of in: out trips) the site on a daily basis during construction. In terms of heavy/other vehicles, an estimated 60 service/deliveries vehicles and minibuses will enter and exit the site daily.

The anticipated trip distribution for traffic accessing the site is as follows:

- 95 % of traffic will be travelling to and from the east (e.g. Coppabella and Mackay); and
- the remainder of 5 % will be travelling to and from the west (e.g. Moranbah).

It is anticipated that the traffic distribution percentages will be the same during construction and full operation.

In addition, assembly of the dragline at the existing Isaac Plains Coal Mine will require a peak workforce of 70 persons over approximately 12 months. It is estimated that 40 % of this workforce will travel to the site by buses from the Coppabella camp, supplied by IPCM with the remainder travelling in private light vehicles. An allowance for an additional 12 trade visitors per day has also been made.

20.14.2.1 Proposed Access/Haul Road and Peak Downs Highway Underpass

An access/haul road will be required between the Expansion Area and the existing Isaac Plains Coal Mine. The access/haul road will include an underpass beneath the Peak Downs Highway. The alignment runs north-west from the northern boundary of the Expansion Area to the Isaac River, along the Belyando/Nebo Shire Boundary (in a north-north-east direction), to the project area boundary, then heads north-west to meet the existing access road to the Isaac Plains Coal Mine (refer to **Figure 20-2** and **Figure 20-3**). The alignment for the access/haul road has been negotiated through consultation with the two affected landholders, and the holder of EPC602 (i.e. Anglo Coal and Exxaro).

This road will be similar in form to the recently-constructed haul road at Carborough Downs Mine, i.e. width and standard for 'big foot' sized road trains, length and the underpass, however, the envelope will be increased to accommodate the relocation of mobile earthmoving plant from the existing Isaac Plains Coal Mine to the Expansion Area on a regular basis.

The construction of the underpass is of a significant nature and is expected to take in the order of nine months to construct. From an operational and safety perspective, i.e. both workers and passing traffic, it would be impracticable to accommodate traffic along the existing Peak Downs Highway during the construction of the underpass.



20.14.3 Environmental Protection Objectives and Control Strategies – Transport

Environmental Protection Objectives And Control Strategies - Transport	
Environmental Value	Maintain trafficability of, and safety on, public roads.
Environmental Protection Objective	To take all reasonable and practicable measures to avoid impacts on public roads by constructing an underpass of the Peak Downs Highway. Construct a suitable access/haul road to connect the existing Isaac Plains Coal Mine and the Expansion Area. Provide for reasonable maintenance of public roads. Provide a safe ingress/egress to the IIPP site.
Performance Indicators/Criteria	No heavy vehicles allowed to access the Peak Downs Highway for the transport of coal. No impacts on the Peak Downs Highway from the construction of the underpass. No public access on the access/haul road.
Control Strategies/Commitments	Public access will not be permitted on the access/haul road to the Expansion Area. Provide a side-track to deviate highway traffic past the underpass construction zone. This side track will be provided to cater for two-way traffic movements and applied in accordance with the requirements of DMR's <i>Manual of Uniform Traffic Control Devices</i> (DMR, 2003). <u>IPCM will consult with the Queensland Department of Transport and Main Roads to ensure all regulatory approvals are obtained and the affected roads are safe and maintain efficient operations.</u> Some IIPP staff and contractors will be transported to and from the Coppabella Camp and to site by minibus. Provide appropriate lighting for the mine access road entry/exit. Ensure the painted medians and other line marking within the existing mine access road intersection is in suitable condition prior to the commencement of construction for the IIPP or dragline (whichever commences first). To augment the intersection's line marking, retro-reflective raised pavement markers (RRPM) will be provided. Linemarking and RRPMs will be provided in accordance with the requirements of DMR's <i>Manual of Uniform Traffic Control Devices</i> (DMR, 2003). For safety reasons the existing Isaac Plains Coal Mine access intersection includes a channelised right turn as per DMR's <i>Road Planning and Design Manual</i> (DMR, 2005) IPCM will contribute approximately \$4,850 towards the upkeep of the eastern section of the Peak Downs Highway during the 12 month construction period. (No ongoing annual contributions would be required).

20.15 IMPLEMENTATION AND OPERATIONS

20.15.1 Continuous Improvement

Site environmental management practices will be refined in the light of company, industry and operational experience in order to improve performance throughout the project. IPCM has commenced the development of an Environmental Management System (EMS), based on the requirements of ISO14001, which will be maintained to ensure that continuous improvement occurs over the life of the IIPP.

20.15.2 Monitoring

Details of measurable indicators for environmental monitoring are provided in the respective strategies throughout the EM Plan.

The IPCM monitoring program will be extended to measure variables relevant to licence conditions, and to measure the environmental performance of any operational system or activity which may have an impact upon compliance with the EA conditions. The monitoring program will follow recognised codes, standards and guidelines, where appropriate, for selection of sample locations, sampling protocols, selection of parameters, sample analysis, and quality assurance. It will also contain records of any appropriate ancillary information which will assist in the interpretation of results.

Laboratory analysis will be undertaken by a NATA registered laboratory accredited for the analysis.

All monitoring and research data collected in accordance with the EA will be maintained and catalogued to allow ready access by IPCM staff and the EPA.



IPCM also intend to implement a shut down procedure in the event of significant and sustained adverse meteorological conditions. These will be established with the specific purpose of protecting ~~noise and~~ air quality amenity for residents within Moranbah ~~and at noise sensitive receptors~~. The procedure will be implemented at the commencement of mining in the Expansion Area. These shutdown limits will be based on the limits described in the EIS and the appropriate meteorological conditions will be established following an analysis of the emissions and propagation characteristics of the operational mine. As part of this process, the EM Plan will also be amended to include any additional appropriate dust control and mitigation measures that may be appropriate to reduce emissions during extreme events at sensitive receptors, including Moranbah.

20.15.3 Training

All employees and contractors involved in construction, operation and rehabilitation activities at the IIPP will be appropriately qualified and experienced to undertake their relevant tasks. All employees are required to complete the IPCM induction training with site specific induction on the environmental responsibilities of the project, prior to commencement of work. The induction training focuses on training staff on the obligations of the Environmental Management Systems currently in place, this EM Plan, the environmental duty of care under the EP Act and the cultural heritage duty of care under the ACH Act.

Additional training will be given to those engaged in activities where specific environmental capabilities may be required to ensure compliance with the EA.

20.15.4 Environmental Auditing

Regular internal and external environmental audits will be conducted of the IIPP in accordance with corporate environmental requirements. The audit reports will be used internally to improve environmental performance and monitor regulatory compliance.

20.15.5 Environmental Reporting

Reporting will be provided to the EPA in accordance with the requirements of the EA. As a minimum, an annual environmental report will be prepared and forwarded to the EPA as part of the Annual Return and also for the National Pollutant Inventory (NPI). To support the annual report, a schedule of statutory and corporate reporting requirements will be maintained and responsibilities assigned. All monitoring, research and planning data collected in accordance with the EA will be maintained and catalogued to allow ready preparation of statutory and corporate reports.

20.16 AMENDED EA

This section of the EM Plan contains the current EA.

DRAFT

Permit¹

S154 Environmental Protection Act 1994

Environmental Authority (Mining Activities) Non-Code Compliant Level 1 Mining Project

Permit number: MIN100329505

Details

Permit Holder(s)	Name	Address
Principal Holder	Bowen Central Coal Pty Ltd	Level 20, AMP Place 10 Eagle Street BRISBANE QLD 4000
Joint Holder	Aquila Coal Pty Ltd	Level 3, South Shore Centre 85 South Perth Esplanade SOUTH PERTH WA 6151

Activity(s)	Activity Location(s)	Estate
Mining Lease	ML70342	

Conditions of Approval

Permit details:

Authorised Mining Tenements

Tenure Type	Tenure Number
ML	70342

Agency interest: General

- G1 Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.

NOTE: The calculation of financial assurance for condition G1 must be in accordance with Environmental Protection Agency (EPA) Guideline 17 and may include a performance discount. The calculation of financial assurance for must be in accordance with EPA Guideline 17. The amount is defined as the maximum total rehabilitation cost for complete rehabilitation of all disturbed areas, which may vary on an annual basis due to progressive rehabilitation. The amount required for the financial assurance must be the highest Total Rehabilitation Cost calculated for any year of the Plan of Operations and calculated using the formula: (Financial Assurance = Highest Total Annual Rehabilitation Cost x Percentage Required)

- G2 The financial assurance is to remain in force until the administering authority is satisfied that no claim on the financial assurance is likely.

NOTE: Where progressive rehabilitation is completed and acceptable to the administering authority, progressive reductions to the amount of financial assurance will be applicable where rehabilitation has been completed in accordance with the acceptance criteria defined within this environmental authority.

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- G3 The environmental authority holder must ensure:
 - a) that all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed; and
 - b) that such measures, plant and equipment are maintained in a proper condition; and
 - c) that such measures, plant and equipment are operated in a proper manner.
- G4 Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.
- G5 Where monitoring is a requirement of this environmental authority, ensure that an appropriately qualified person conducts all monitoring.
- G6 Spillage of all flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm (other than trivial harm) and maintained in accordance with Section 5.8 of AS 1940 - Storage and Handling of Flammable and Combustible Liquids of 2004.
- G7 Spillage of all chemicals must be contained within an on-site containment system and controlled in a manner that prevents environmental harm.
- G8 Words and phrases used throughout this environmental authority are defined in Attachment 1 - Environmental authority (mining activities) non-code compliant level 1 mining project word definitions. Where a definition for a term used in this environmental authority is sought and the term is not defined within this environmental authority, the definitions in the Environmental Protection Act 1994, Environmental Protection Regulations and Environmental Protection Policies must be used.

Agency interest: Impacts on surrounds

- I1 The release of dust or particulate matter resulting from the mining activity must not cause an environmental nuisance at any sensitive place.
- I2 Dust or other particulate monitoring must be undertaken by the environmental authority holder as directed by the administering authority to investigate any complaint about environmental nuisance being caused by dust or other particulate matter from the mining activities, which in the opinion of an authorised person is not frivolous, vexatious nor based on mistaken belief, and the results thereof notified to the administering authority within 14 days following completion of monitoring. For the purposes of this condition, monitoring must be carried out at a site relevant to the potentially affected sensitive place and at upwind control site(s) and must include:
 - (a) for a complaint alleging dust nuisance, dust deposition rate; and
 - (b) for a complaint alleging adverse health effects caused by dust, the concentration per cubic meter of suspended PM10 over a 24 hour averaging time.
- I3 For the purposes of condition A1 and without limiting the applicability of other criteria relevant in particular circumstances, the mining activities would cause environmental nuisance where dust or other particulate matter resulting from the mining activities exceeds the following limits when measured at a relevant sensitive place:
 - a) dust deposition of 120 milligrams per square metre per day, averaged over one month, when

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monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulates - Deposited matter - Gravimetric method of 1991; and
b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a sensitive place downwind of the operational land, when monitored in accordance with:
- Particulate matter - Determination of suspended particulate PM10 high-volume sampler with size-selective inlet - Gravimetric method, when monitored in accordance with AS 3580.9.6 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM (sub) 10 high volume sampler with size-selective inlet - Gravimetric method of 1990; or
- Any alternative method of monitoring PM10 which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.

NOTE: You must propose which monitoring method is appropriate in accordance with condition A3 (a) or (b) or both.

- 14 If monitoring indicates exceedence of the relevant limits in condition A3, then the environmental authority holder must:
a) address the complaint including the use of appropriate dispute resolution if required; or
b) immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.

Agency interest: Land

- L1 The irrigation of treated effluent must be carried out in a manner such that:
- vegetation is not damaged;
- soil erosion and soil structure damage is avoided;
- there is no surface ponding of treated effluent;
- percolation of treated effluent beyond the plant root zone is minimised;
- the capacity of the land to assimilate nitrogen, phosphorus, salts, water and organic matter (as measured by oxygen demand) is not exceeded; and
- the quality of groundwater is not adversely affected.
- L2 Notices must be prominently displayed on any treated effluent irrigation area warning staff and the public that the area is irrigated with treated effluent and not to use or drink the treated effluent. These notices must be maintained in a visible and legible condition.
- L3 The daily volume of contaminants released to land must be determined by an appropriate method, for example a flow meter, and records kept of such determinations.
- L4 The effluent irrigation areas must have a separation distance of at least 30 meters from any groundwater bores and surface waters.
- L5 All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Attachment 1 - Table 7 and Table 8.
- L6 Progressive rehabilitation must commence when areas become available within the operational land.

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- L7 Complete an investigation into rehabilitation of proposed areas of disturbance and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Attachment 1 - Table 7 by 30 June 2010. Development of acceptance criteria is to consider the re-establishment of representative regional ecosystems (analogue sites or another suitable alternative approved by the administering authority) and functioning habitat of areas equal to or greater than areas to be cleared and specific revegetation performance descriptors (eg. rehabilitated areas are to display characteristics of the existing (pre-mining) regional ecosystems).
- L8 Complete an assessment report, to be undertaken by a Registered Professional Engineer of Queensland (RPEQ), of geotechnical issues and erosivity of the proposed final landforms, including final voids, by 30 June 2010 to demonstrate long-term landform stability. Reference is to be made to the Queensland Mining Guidelines (or subsequent reprints) in making this assessment.
- L9 The EM Plan and Plan of Operations must be consistent with the geotechnical and erosivity assessment (outlined in condition L8) within three months of the completion of the assessment (outlined in condition L8).
- L10 Residual voids must comply with the following outcomes;
a) residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority; and
b) residual voids must comply with Attachment 1 - Table 9.
- L11 Areas which are to be rehabilitated to native ecosystem must achieve a self sustaining native ecosystem with species composition and distribution similar to an analogue site or another suitable alternative approved by the administering authority.
- L12 Areas to be rehabilitated must be rehabilitated to the landform design criteria defined in Attachment 1 - Table 8 and the landforms must be stable.
- L13 All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner / holder.
- L14 Cleared vegetation from the site must be managed in accordance with the following hierarchy:
(a) reuse, eg. use of logs and tree stumps as shelter for fauna in rehabilitated areas;
(b) recycle, eg mulching of vegetation and use in rehabilitation on the site; and
(c) other alternative management options implemented in a way that causes the least amount of environmental harm.
- L15 Where reasonable and practicable, areas of the site where grazing is nominated as the post-mine land use must include native grass species endemic to the area.
- L16 A Weed Management Plan must be developed and implemented during the continuation of this environmental authority, and prior to the commencement of construction activities. The Weed Management Plan must describe how the weeds are to be managed in accordance with the Land Protection (Pest and Stock Route Management) Act 2002 and/or local government requirements for

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weeds not declared under state legislation.

Agency interest: Noise

- N1 Noise from the mining activities must not cause an environmental nuisance, at any sensitive place.
- N2 Noise monitoring must be undertaken by the environmental authority holder as directed by the administering authority to investigate any complaint about noise nuisance being caused by the mining activities, which in the opinion of an authorised person is not frivolous, vexatious nor based on mistaken belief, and the results thereof notified to the administering authority within 14 days following completion of monitoring. For the purposes of this condition, noise monitoring must include:
- (a) LA, max adj, T ;
 - (b) relevant background sound level
 - (c) the level and frequency of occurrence of impulsive or tonal noise;
 - (d) atmospheric conditions including wind speed and direction; and
 - (e) location, date and time of recording.
- N3 For the purposes of condition N1 the mining activities will not cause environmental nuisance where noise from the mining activities does not exceed the criteria specified in Attachment 1 - Table 4 and Table 5.
- N4 If monitoring indicates exceedence of the limits in Attachment 1 - Table 4 and Table 5, then the environmental authority holder must:
- a) address the complaint including the use of appropriate dispute resolution if required; or
 - b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.
- N5 The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.
- N6 Vibration from the mining activity must not cause an environmental nuisance, at any sensitive place.
- N7 Monitoring must be undertaken by the environmental authority holder as directed by the administering authority to investigate any complaint about vibration nuisance being caused by the mining activities, which in the opinion of an authorised person is not frivolous, vexatious nor based on mistaken belief, and the results thereof notified to the administering authority within 14 days following completion of monitoring. For the purposes of this condition, monitoring must be carried out in accordance with the latest edition of the EPA Noise Measurement Manual and include:
- a) peak particle velocity (mm/s);
 - b) air blast overpressure level (dB linear peak);
 - c) location of the blast/s within the mining area (including which bench level);
 - d) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
 - e) location, date and time of recording.
- N8 For the purposes of condition N6 the mining activities will not cause environmental nuisance where vibration from the mining activities does not exceed the criteria specified in Attachment 1 - Table 5 and Table 6.

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- N9 If monitoring indicates exceedence of the limits in Attachment 1 - Table 5 and Table 6, then the environmental authority holder must:
a) address the complaint including the use of appropriate dispute resolution if required; or
b) immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.
- N10 Every explosive blast for the mining activity shall be designed by a competent person to achieve the criteria specified in Attachment 1 - Table 5 and Table 6.
- N11 All relevant information pertaining to the design of every explosive blast for the mining activity in relation to the criteria specified in Attachment 1 - Table 5 and Table 6 shall be kept in written and diagrammatic form.

Agency interest: Social

- S1 All complaints received must be recorded including details of complainant, reasons for the complaint, investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.

Agency interest: Waste

- W1 Tyres stored awaiting disposal or transport for take-back and recycling, or waste-to-energy options - should be stockpiled in volumes less than 3m in height and 200 sq.m in area and at least 10m from any other tyre storage area.
- W2 All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.
- W3 Disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable.
- W4 Scrap tyres disposed within the operational land must not impede saturated aquifers and compromise the stability of the consolidated landform.
- W5 All regulated waste removed from the site must be removed by a person who holds a current approval to transport such waste under the provisions of the Environmental Protection Act 1994.
- W6 Regulated waste must only be removed to a facility licensed under the Environmental Protection Act 1994 to receive such waste.

Agency interest: Water

- WA1 Monitoring must be undertaken at the authorised water release points shown in Attachment 1 - Figure 1, for the parameters and at the frequency specified in Attachment 1 - Table 1, and be
(a) carried out in accordance with the latest edition of the EPA Water Quality Sampling Manual; and
(b) carried out on representative samples.
- WA2 Contaminants must only be released to waters from the release points W2 and W4 as specified in Attachment 1 - Table 1 and in compliance with the release limits shown in Attachment 1 - Table 1.

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- WA3 Contaminants must not be released by the conduct of the mining activities to any waters or the bed and banks of any waters except as provided for by condition WA1.
- WA4 Effective erosion protection and sediment control measures must be implemented and maintained.
- WA5 All effluent released from the treatment plant must be monitored for the parameters and at the frequency specified in Attachment 1 - Table 2.
- WA6 Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in Attachment 1 - Table 2.
- WA7 Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any sensitive place.
- WA8 Sewage effluent from sewage treatment facilities must be reused or evaporated and must not be directly released from the sewage treatment plant to any waters or the bed and banks of any waters.
- WA9 Groundwater affected by the mining activities must be monitored at the locations shown in Attachment 1 - Figure 2 and at the frequencies specified in Attachment 1 - Table 3, and be:
(a) carried out in accordance with the latest edition of the EPA Water Quality Sampling Manual.
- WA10 In the event that groundwater fluctuations in excess of 2 meters/yr are detected at the groundwater monitoring locations nominated in WA9, and the fluctuations are not the result of pumping from licensed bores, the EPA must be notified within 14 days.

sch4p3(3) Prejudice the protection of an individuals right to privacy

Signed

Ricci Churchill
Environmental Protection Agency

Date 30/5/05

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Attachment 1

Permit number MIN100329505

Environmental authority (mining activities) non-code compliant level 1 mining project word definitions

Words and phrases used throughout this licence are defined below except where identified in the EP Act or subordinate legislation. Where a word or term is not defined, the ordinary English meaning applies, and regard should be given to the Macquarie Dictionary.

Interpretation

"EMPlan" means the Environmental Management Plan report titled Isaac Plains Project Environmental Assessment Report Volume 1 and 2 dated March 2005. Although legally the environmental authority is the enforceable document, not the EMPlan, if there was any need for interpretation of the conditions, then the interpretation should be in the context of the EMPlan.

Definitions

"acceptance criteria" means the measures by which the actions implemented to rehabilitate the land are deemed to be complete (same as completion criteria).

"airblast overpressure" means energy transmitted from the blast site within the atmosphere in the form of pressure waves. The maximum excess pressure in this wave, above ambient pressure is the peak airblast overpressure measured in decibels linear (dB).

"ambient (or total) noise" at a place, means the level of noise at the place from all sources (near and far), measured as the Leq for an appropriate time interval.

"appropriately qualified person" means any person who conforms to the EPA operational policy for an "appropriately qualified person (analyst)" in accordance with Section 490(7) of the *Environmental Protection Act 1994*.

"ARD" means acid rock drainage and refers to the low pH, high heavy metal pollutant typical of sulphidic mine wastes, and most commonly associated with the production of ferrous iron and sulphuric acid through the oxidation of sulphide minerals.

"authority" means environmental authority (mining activities) under the *Environmental Protection Act 1994*.

"blasting" means the use of explosive materials to fracture-

- (a) rock, coal and other minerals for later recovery; or
- (b) structural components or other items to facilitate removal from a site or for reuse.

"climax community" flora and fauna communities have attained a stable biological diversity and have reached equilibrium with the surrounding ecosystems.

"commercial place" means a place used as an office or for business or commercial purposes, other than a place within the boundaries of the operational land.

"environmental authority holder" means the holder of this environmental authority.

" $L_{A 10, \text{adj}, 10 \text{ mins}}$ " means the A-weighted sound pressure level, (*adjusted for tonal character and impulsiveness of the sound*) exceeded for 10% of any 10-minute measurement period, using Fast response.

" $L_{A 1, \text{adj}, 10 \text{ mins}}$ " means the A-weighted sound pressure level, (*adjusted for tonal character and impulsiveness of the sound*) exceeded for 1% of any 10-minute measurement period, using Fast response

" $L_{A, \text{max adj}, T}$ " means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over any 10 minute period, using Fast response.

"land" in the "land schedule" of this document means land excluding waters and the atmosphere.

"land capability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land suitability" as defined in the DME 1995 Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland.

"land use" term to describe the selected post mining use of the land, which is planned to occur after the cessation of mining operations.

"leachate" means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

"noxious" means harmful or injurious to health or physical well being, other than trivial harm.

"offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive, other than trivial harm.

"peak particle velocity (ppv)" means a measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres/second (mms^{-1}).

"protected area" means -

- a protected area under the *Nature Conservation Act 1992*; or
- a marine park under the *Marine Parks Act 1992*; or
- a World Heritage Area.

"progressive rehabilitation" means rehabilitation (defined below) undertaken progressively OR a staged approach to rehabilitation as mining operations are ongoing.

"rehabilitation" the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.

"representative" means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.

"self sustaining" means an area of land which has been rehabilitated and has maintained the required acceptance criteria without human intervention for a period nominated by the administering authority.

"sensitive place" means;

- a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; or
- a motel, hotel or hostel; or
- an educational institution; or
- a medical centre or hospital; or
- a protected area under the *Nature Conservation Act 1992*, the *Marine Parks Act 1992* or a World Heritage Area; or
- a public park or gardens; or
- a place used as a workplace, an office or for business or commercial purposes which is not part of the mining activity and does not include employees accommodation or public roads.

"Shields, P.G. and Williams, B.M. (1991)" means Shields, P.G. and Williams, B.M. (1991) Land resource survey and evaluation of the Kilcummin area, Queensland. QDPI Bulletin QV 91001.

"stable" means geotechnical stability of the rehabilitated landform where instability related to the excessive settlement and subsidence caused by consolidation / settlement of the wastes deposited, and sliding / slumping instability has ceased.

"waters" includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined water natural, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), and any under ground water, any part thereof.

WATER

Table 1 (Water contaminant release limits)

Monitoring point	Easting (AMG)	Northing (AMG)	Parameter	Minimum	Maximum	Monitoring Frequency
W1	616648	7570677	pH	-	-	Once daily during discharge events
			Electrical Conductivity ($\mu\text{S}/\text{cm}$)	-	-	
			Total Suspended Solids (mg/L)	-	-	
W2	614811	7569122	pH	6.5	8.5	
			Electrical Conductivity ($\mu\text{S}/\text{cm}$)	-	W1 + 10%	
			Total Suspended Solids (mg/L)	-	W1 + 10%	
W3	618488	7566780	pH	-	-	
			Electrical Conductivity ($\mu\text{S}/\text{cm}$)	-	-	
			Total Suspended Solids (mg/L)	-	-	
W4	616301	7566347	pH	6.5	8.5	
			Electrical Conductivity ($\mu\text{S}/\text{cm}$)	-	W3 + 10%	
			Total Suspended Solids (mg/L)	-	W3 + 10%	

Table 2 (Sewage treatment effluent quality targets for dust suppression and irrigation)

Monitoring point	Release Limit				
	Quality characteristics	Minimum	50th Percentile	Maximum	Frequency
Treated effluent storage pond	5-day Biological Oxygen Demand (mg/L)	-	-	20	monthly
	Suspended Solids (mg/L)	-	-	30	
	Thermotolerant coliforms (CFU/100mL)	-	100	1000	
	Total Phosphorus (mg/L)	-	5	15	
	Total Nitrogen (mg/L)	-	10	30	
	pH	6.5	-	8.5	

30/5/05

Table 3 (Groundwaters monitoring locations and frequency)

Monitoring point	Easting (AMG)	Northing (AMG)	Monitoring Frequency
Burton Coal Bore 2	620384	7573599	Quarterly
Swamp Bore 1	621518	7568790	
DNR 13060284	620271	7566322	

NOISE

Table 4 (Noise limits)

Noise Descriptor dB(A) measured as	Monday to Saturday			Sundays and public holidays		
	7am – 6pm	6pm – 10pm	10pm – 7am	7am – 6pm	6pm – 10pm	10pm – 7am
L _{A10} , adj, 10 mins	Background + 5	Background + 5	Background + 3	Background + 5	Background + 5	Background + 3
L _{A1} , adj, 10mins	Background + 10	Background + 10	Background + 5	Background + 10	Background + 10	Background + 5

Where "Background" means background sound pressure level measured in accordance with the latest edition of the Environmental Protection Agency *Noise Measurement Manual*.

Table 4 does not purport to set operating hours for the mining activities.

Note: The method of measurement and reporting of noise levels must comply with the latest editions of the Environmental Protection Agency's Noise Manual

Table 5 (Airblast Overpressure Level)*

Noise Parameter	Airblast Overpressure measured at a sensitive place	
	Monday to Sunday 9am - 7pm	Other times and public holidays
Air blast overpressure level (dB [Lin] Peak)	Maximum 115 dB for 4 out of 5 consecutive blasts	No blasting to occur
Air blast overpressure level (dB [Lin] Peak)	120 dB maximum	No blasting to occur

* Table 5 does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.

Table 6 (Vibration limits)*

Vibration Parameter	Vibration measured at a sensitive place	
	Monday to Sunday 9am - 7pm	Other times and public holidays
Peak particle velocity (mm/s)	Maximum 5 mm/s for 4 out of 5 consecutive blasts	No blasting to occur
Peak particle velocity (mm/s)	10mm/s maximum	No blasting to occur

* Table 6 does not purport to set limits applicable to any particular explosive blast, rather sets design criteria for every explosive blast.

LAND

Table 7 (Final land use and rehabilitation approval schedule)

	Disturbance type					
	Residual Voids	Waste rock dump(s)	Sediment / Supply Dams	Infrastructure	ROM area	Road(s) and tracks
Projective surface area (ha)*	42	414	35	3	3	28
Map reference	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1	Figure 1
Pre-mine land use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
Post-mine land use	Water storage	Native Ecosystem	Water storage	Grazing	Grazing	Grazing or to remain as farm access upon agreement with landholder
Post-mine land capability classification	V	V	V	IIV	II - IV	III or V
Projective cover range (%)	N/a	70%	N/a	70%	70%	N/a

*based on conceptual design details

Table 8 (Landform design)

Disturbance Type	Maximum Slope Range %	Projective Surface Area (ha)
Waste Rock Dump – external wall	15% (8.5°)	150
Waste Rock Dump – low wall	73% (36°)	92
Boxcut batter	100% (45°)	17

30/5/05

Table 9 (Residual void design)

Void identification	Void wall –competent rock slope (%)	Void low wall –incompetent rock slope (%)	Void maximum surface area (ha)
Pit A	275% (70°)	73% (36°)	23
Pit B	275% (70°)	73% (36°)	12
Pit C	275% (70°)	73% (36°)	7

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Figure 1 – Water monitoring points & final land use and rehabilitation areas

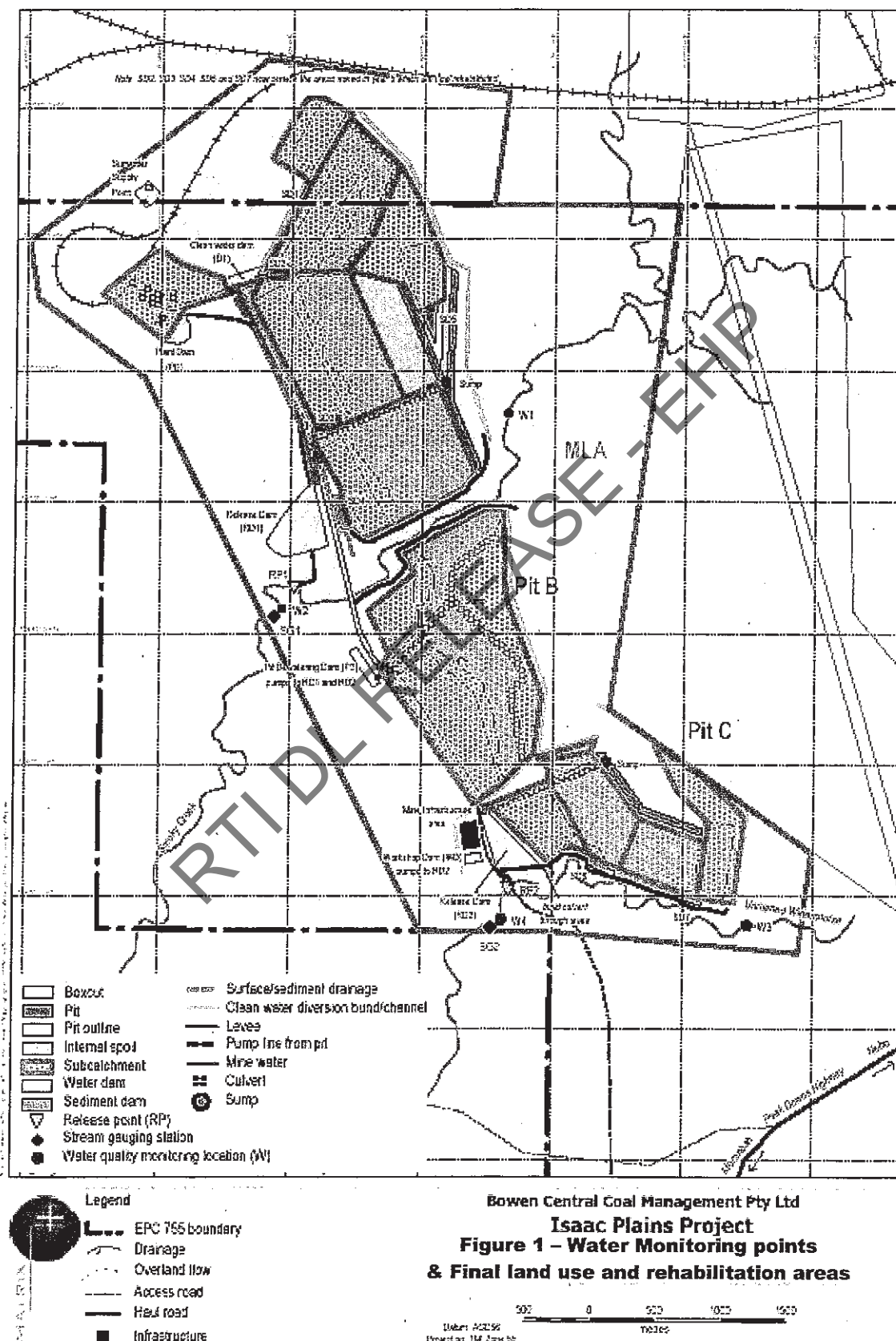
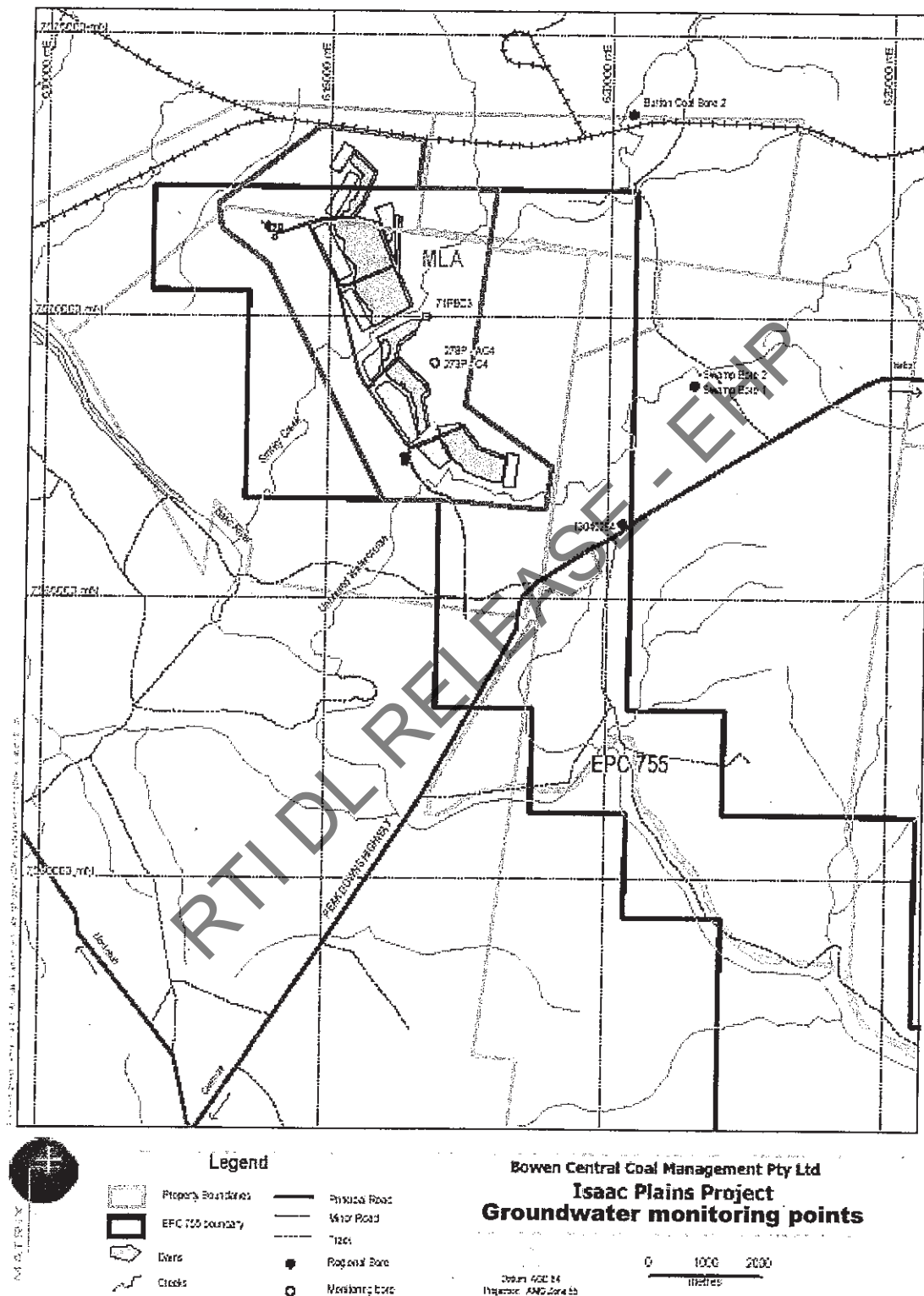


Figure 2 – Groundwater monitoring points



Release

Assessment Report: (3-AR)
Mining Activities

EA App No: MIN100329505

Due Date: 30 May 2005

File No: MKY1959

Type of Application: s154 Application for environmental authority (mining activities)
Environmental Protection Act 1994

Type of Decision: s207 Decision to refuse or allow to proceed
Environmental Protection Act 1994

Applicant Details:

Name: BOWEN CENTRAL COAL PTY LTD & AQUILA COAL PTY LTD

Project: Isaac Plains Project

Mining Tenement: ML70342

Site Address: Peak Downs Highway, approximately 28km west of Coppabella

Environmentally Mining activities

Relevant Activities:

1. DESCRIPTION OF OPERATION

The Environmental Protection Agency (EPA) received an application for a non-code compliant environmental authority (mining lease) for a level 1 mining project on 14 March 2005 from Bowen Central Coal Pty Ltd and Aquila Coal Pty Ltd ("the applicants").

The applicants propose to carry out the operation of the "Isaac Plains Project" which is a proposed open-cut coal mine producing 1.9 Mtpa ROM thermal and coking coal product. The site is located within EPC 755 (also owned by the applicants), approximately 28km west of Coppabella. Coal product will also be crushed, sized and washed on site, before being railed to Dalrymple Bay Coal Terminal for export. See appendix 1 for mine and terminal location details.

Major components of the proposed mine are shown in the conceptual mine layout shown in Appendix 2 and include:

- Three open cut pits;
- Coal handling and preparation plant (CHPP) area including crushing facility, coal stockpile pad and temporary reject stockpiles;
- A Mine Infrastructure Area which includes office buildings, workshops, controlled access gate and sewage treatment plant;
- Water management structures; and
- Rail loop.

The mine will operate on a continuous basis of 24 hours/day for 364 days/year. At an annual extraction rate of 1.9 Mtpa, the mine life is estimated as 9 years. Coal will be extracted from three separate pits referred to as Pit A, Pit B and Pit C, as illustrated in Appendix 2. Coal will be extracted using

Release

conventional open-cut mining techniques, using excavators and trucks. High wall mining will also occur upon completion of the economic removal of coal using conventional truck and shovel method. Overburden will require drilling and blasting prior to removal by excavator.

The Smoky Creek watercourse flows in a NE/SW direction through the proposed mining lease. A smaller tributary of the Isaac River referred to as the 'Unnamed Watercourse', flows through the southern portion of the proposed mining lease. The pit layout is dominated by the need to maintain flows through Smoky Creek as shown in Appendix 2. Both Smoky Creek and the Unnamed Watercourse will be protected by flood levees during mining to prevent the uncontrolled release of dirty mine water to the creeks.

A co-disposal site will not be required for the proposed mining operation, as the thickener underflow will be dewatered in belt press filters, which squeeze extra water from the tailings for immediate re-use in the plant. Under this process the tailings are dewatered to around 70% solids (30% moisture) and will be disposed with the other rejects (coarse & fines) within in-pit disposal areas therefore negating the need for pumping to a tailings dam.

Based on the activities proposed for the Isaac Plains Project, non-mining environmentally relevant activities (ERA's) that are also proposed to be carried out on site.

- 7(b) Chemical storage – 1,000 m³ or more
- 11(b) Petroleum product storage – 500,000 L or more
- 15(b) Sewage treatment works – less than 1500 equivalent persons
- 28 Motor vehicle workshop
- 84(b) Regulated waste storage

The applicants are committed to providing the necessary financial resources and capabilities to construct, operate and successfully rehabilitate the Isaac Plains project on completion of mining. The applicants will provide a financial assurance in the amount and form required by the EPA, which will be determined through the Plan of Operations process, prior to commencement of the activity.

The applicants are also committed to appropriate maintenance of plant and equipment necessary to support compliance with this Environmental Management Plan (EMPlan) and conditions of Environmental Authority (EA). Monitoring will be undertaken in accordance with relevant standards with records kept for a minimum of five years. Pertinent records will be made available to the EPA, upon request.

On 18 March 2005 the EPA Co-ordinated Assessment Committee recommended that the application be assessed as a level 2 project with no requirement for and Environmental Impact Statement. A notice to this effect was sent to the applicant from the Ecoaccess Customer Service Unit on 30 March 2005.

The submitted EMPlan has also been reviewed in drafting the attached draft environmental authority to determine compliance with section 203 of the *Environmental Protection Act 1994* (EPAct). The attached checklist confirms that the EMPlan meets the requirements of the EPAct.

ASSESSMENT CONSIDERATIONS

1.1. SECTION 154 – GENERAL REQUIREMENTS FOR APPLICATION

(1) An environmental authority (mining activities) application must -

(a) be made to the mining registrar in the approved form; and

the application was made in the approved form.

(b) state whether the application is for a code compliance or non-code compliant authority; and

Release

the applicant applied for a non-code compliant authority

(d) be accompanied by the fee prescribed under a regulation

correct fees submitted with application.

(2) If the application is for a non-code compliant authority, the application must be supported by enough information to allow the administering authority to decide the application.

The application is supported by enough information to make a decision. These include documents entitled Environmental Assessment Report Volumes 1 and 2. The Environmental Assessment Reports meet the criteria under section 203 of the EPA Act for an EMPlan submission.

(3) If the application is for another type of environmental authority (mining activities), it must also be supported by enough information to allow the administering authority to make an assessment level decision for the application.

The application is supported by enough information (EMOS) to make a decision.

1.2. SECTION 207 – ADMINISTERING AUTHORITY MAY REFUSE APPLICATION

207 (1) The administering authority must, within the period prescribed under a regulation (the refusal period), consider the application and decide either to refuse it or allow it to proceed under divisions 5 to 7.

(2) The authority must, in making the decision, consider the following—

(a) the application documents for the application;

The application documents provided by the applicant was duly considered during the assessment of the application.

(b) the standard criteria;

ESD can be defined as 'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'. The principle essentially contains two components - ecology and quality of life over time.

As the proposal includes any surface area disruption, there is likely to be land disturbance, the ecological processes in the long term however are unlikely to be affected. The extraction of natural resources as part of the mining proposal is consistent with standard mining practice.

The proponent has undertaken noise monitoring at the nearest sensitive receptors and concluded that an increase of 3dB(A) above background noise level on Sundays and public holidays between 10pm and 7am will not impact on the quality of life for the sensitive receptors.

The imposition of conditions in relation to the management of noise and vibration will ensure that the proposed mining activities are consistent with the principles of ESD.

any applicable environmental protection policy; and

N/a

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any applicable Commonwealth, State or local government plans, standards, agreements or requirements; and

N/a

any applicable environmental impact study, assessment or report; and

An EMPlan was prepared as part of the assessment and approvals process for the proposal at the initial submission of the application. The submitted EMPlan is very extensive and appears to make an assessment of all of the potential environmental impacts caused by the proposed operation and the mitigation measures that will be taken to prevent these.

the character, resilience and values of the receiving environment; and

The area immediately surrounding the mine is essentially of a 'rural' character. Cattle grazing and other mining activity occur on the surrounding land in the area. The rest of the surrounding land is currently under mining operations.

all submissions made by the applicant and interested parties; and

n/a

the best practice environmental management for the activity under the authority, program, order or permit; and

The open-cut mining application will involve standard drill and blast and truck and shovel technology for removal of coal.

the financial implications of the requirements of the authority, program, order or permit as they would relate to the type of activity or industry carried on under the authority, program or order; and

The applicants have indicated that adequate finances will be provided for compliance with the environmental authority.

the public interest; and

n/a

any applicable site management plan; and

Considered EMPlan submitted for the site

any other matter prescribed under a regulation.

None

(c) any suitability report obtained for the application

N/A

(d) the status of any application under the Mineral Resources Act for each relevant mining tenement

The applicant has submitted a valid application to the Department of Natural Resources and Mines for the MLA 70342.

2. RECOMMENDATIONS

The draft EA has been prepared and commented on from the applicant: It is recommend that:

1. The application be allowed to proceed to the next stage (public notice and objections); and
2. The draft Environmental authority (mining activities) non-code compliance Level 1 mining project be issued to the mining registrar within 5 business days as per section 208 of the EPAct.
3. Details of the decision be recorded in the appropriate register (Ecotrack).

Assessing Officer: Rebecca McAuley

Date: 26/05/05

3. REVIEW AND ENDORSEMENT

Reviewer: David McLean

sch4p3(3) Prejudice the protection of an individuals right to privacy

Date:

4. DECISION

Delegate: Ricci Churchill

sch4p3(3) Prejudice the protection of an individuals right to privacy

Date:

30/5/05

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Checklist

Mining

Content requirements for submitted EM Plan

This checklist is to be used to assess whether the EM Plan content requirements have been met in a submitted EM Plan, under section 203 of the Environmental Protection Act 1994.

Reference No.	MIN100329505
---------------	--------------

For each question below, indicate whether the EM Plan contains statements addressing the items listed (refer section 203).

Statement in EM Plan	Yes	No
1. Each relevant mining lease	☒	☐
2. A description of all relevant mining activities	☒	☐
3. The land on which relevant mining activities are to be carried out	☒	☐
4. The environmental values likely to be affected by relevant mining activities	☒	☐
5. The potential adverse and beneficial impacts of the mining activities on the environmental values	☒	☐
6. Any Code of Environmental Compliance and Standard Environmental Conditions that are to apply to the relevant mining activities	☐	☐
7. To the extent a Code of Environmental Compliance does not apply to the relevant mining activities, the environmental protection commitments and best practice environmental management techniques the applicant proposes to protect and enhance environmental values	☐	☐
8. Whether an EIS under the State Development Act has been prepared	☒	☐
9. Any other matter prescribed under an environmental protection policy or a regulation, for example, waste management programs, monitoring of releases	☒	☐
10. Environmental protection commitments stated in a way that allows them to be measured and to be audited	☒	☐
11. Environmental protection objectives and the standards and measurable indicators, including, for example, objectives for progressive and final rehabilitation and management of contaminated land	☒	☐



Checklist Content requirements of submitted EM Plan

12. Control strategies to ensure the objectives are achieved, including for example, strategies in relation to the mining activities-	☒	☐
<ul style="list-style-type: none">• continuous improvement• environmental auditing• monitoring• reporting• staff training.		

Recommendation

Tick which of the following applies:

☒ The submitted EM Plan content requirements are met
(entitled Environmental Assessment Report vol. 195)

☐ The submitted EM Plan content requirements are not met

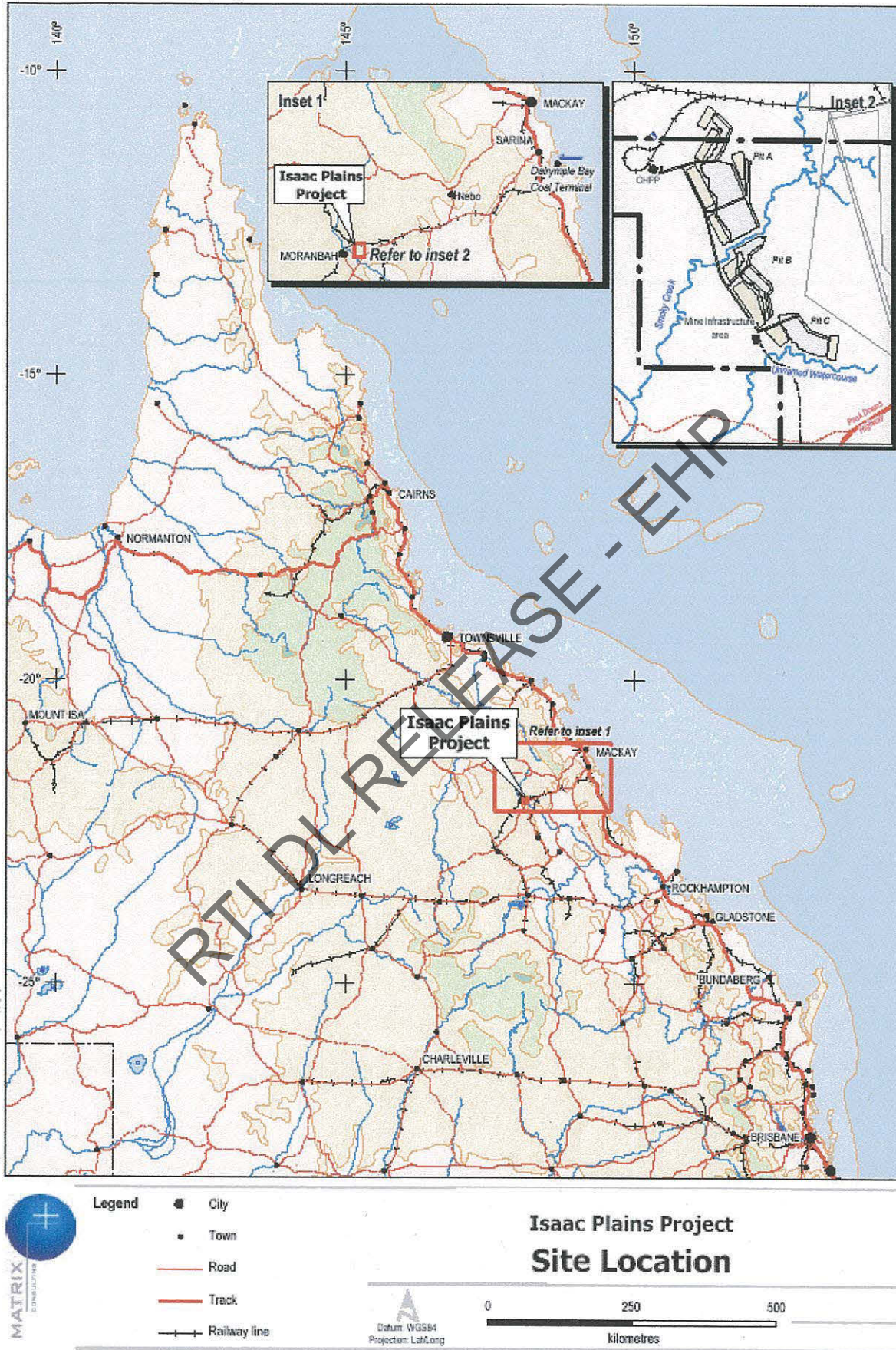
- An EM Plan must provide enough information to allow the authority to decide the application and conditions to be imposed on the environmental authority.
- After completing the list above, consider the boxes marked and prepare a 'EM Plan assessment report' (s206) in accordance with 'Mining Industry Impact Assessment - Policies and Guidelines'.

Assessing Officer Name: Rebecca McAuley	Date: 30 May 2005
--	--------------------------

sch4p3(3) Prejudice the protection of an individuals right to privacy

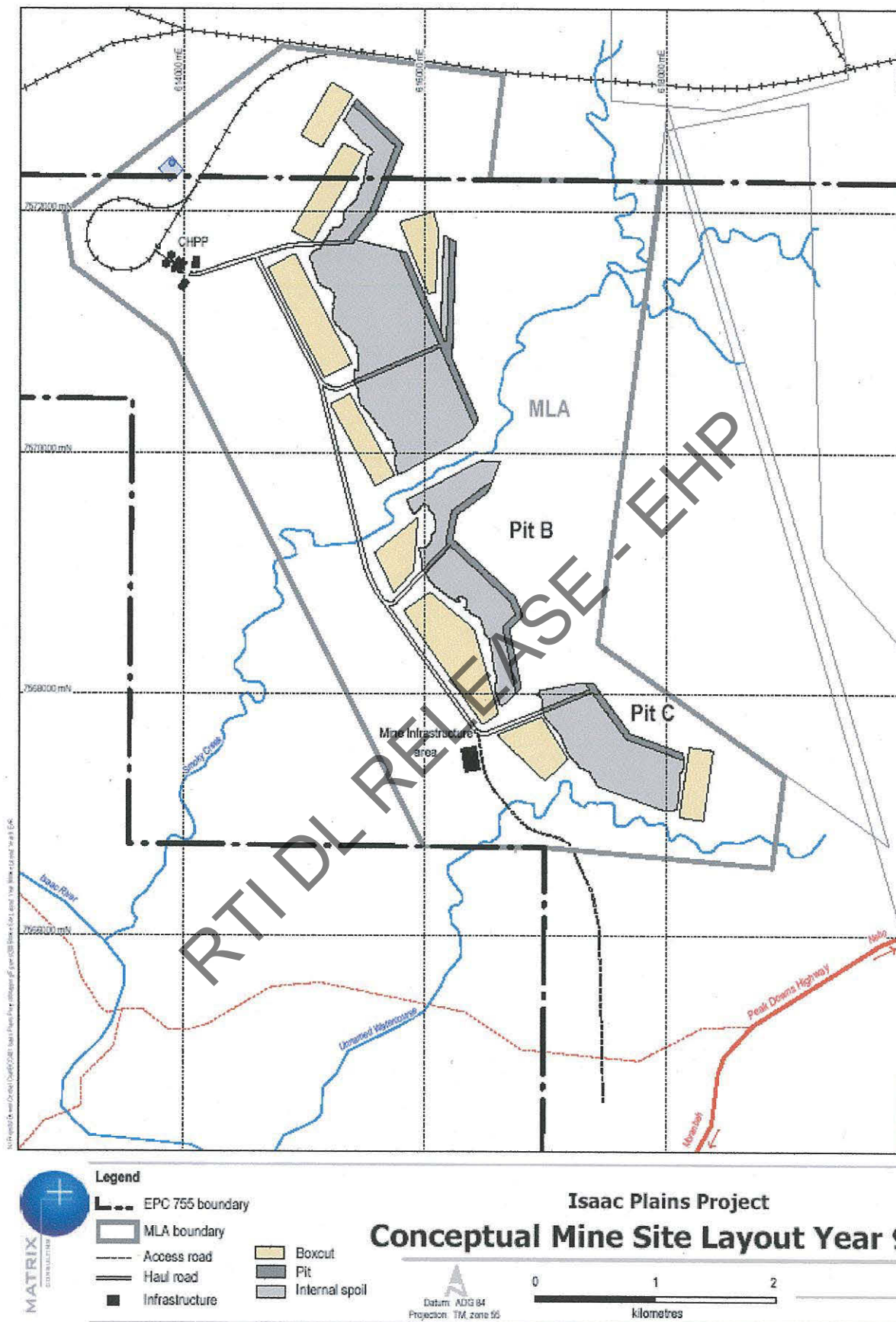
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Appendix 1 – Site Location



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Appendix 2 – Conceptual Mine Site Layout





Isaac Plains Coal Management Pty Ltd
(as Manager for and on behalf of the participants
in the Isaac Plains Coal Joint Venture)

Peak Downs Highway ♦ via Coppabella
PO Box 635 ♦ Moranbah ♦ QLD ♦ 4744 ♦ AUSTRALIA
Tel: 07 4958 0888 ♦ Fax: 07 4958 0880

23 June 2010

IPCM 20100623 CO DERM Extension of Time Request

Glen Wright
Department of Environment and Resource Management
PO Box 906
Emerald QLD 4720

By Email: To: Glen.Wright@derm.qld.gov.au

RE: REQUEST FOR EXTENSION OF ENVIRONMENTAL AUTHORITY TIMEFRAMES

Glen,

Isaac Plains Coal Management (IPCM) wishes to request an extension of the prescribed timeframes outlined in Environmental Authority MIN100329505, specifically Conditions F6 and F12.

IPCM has engaged specialist environmental consultants AXM to undertake the works as detailed under Condition F6 of the EA. Due to time constraints it is expected that the majority of the field work component will be undertaken by the end of June however; reporting will not be completed in time for the June 30 completion date. IPCM is proposing an extension of this date out to the 31st August 2010.

With regard to Condition F12, IPCM is currently undertaking an extensive review of final landform design and has engaged Echelon Mining Consultants to undertake this work. The timeframe for completion of these works is expected to be finalised by the 30th September. Once this work has been completed any associated design changes can be implemented in the assessment report as required under Condition F12. To this end, IPCM is proposing an extension of the prescribed 30th June completion date, out to the 31st December 2010.

IPCM believes the requested timeframe extensions of the EA will provide sufficient time to complete the required works effectively and seek the Departments authorisation at its convenience.

Yours sincerely

sch4p3(3) Prejudice the protection of an individuals right to privacy

Phil Nobes
Operations Manager
Isaac Plains Coal Management

Tel: 07 4958 0881

sch4p3(3) Prejudice the protection of an individuals right to privacy

Email: pnobes@isaacplains.com.au

Isaac Plains Coal Management Pty Ltd
A.B.N. 76 114 277 315

4. 100719_Isaac Plains Site Shut Down Procedure..txt

From: Lynden.Cini@jhgc.com.au
Sent: Monday, 19 July 2010 12:09 PM
To: Wright Glen
Cc: Cameron.Farrington@jhgc.com.au; pnobes@isaacplains.com.au
Subject: Isaac Plains Site Shut Down Procedure.

Attachments: JHM300-ENV-PRO-007_1 - Site Shutdown Procedure.pdf

Glen,

Please see a copy of the Isaac Plains Site Shut Down Procedure (attached), as required under Condition B4 of the current EA. Please consider this as formal submission of the document to the Department for approval. If a hard copy is required, please advise and I will post a copy through.

As usual, please do not hesitate to contact me if you require any additional information in regard to the below document.

Regards

Lynden Cini
Environment and Community Officer
John Holland Group Pty Ltd
Isaac Plains Coal Mine - Peak Downs Highway (PO Box 181), Moranbah QLD 4744
Ph +61 7 30042021 sch4p3(3)mob +61 7 30042021 the protection of an individuals right to privacy
> Lynden.Cini@jhgc.com.au | ü www.johnholland.com.au
P Please consider the environment before printing this e-mail

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SITE SHUTDOWN PROCEDURE

EA MIN100329505 Requirement Condition B4



PREPARED BY: L. Cini					
JHG					
APPROVED BY: Cameron Farrington,					
Site Senior Executive		Date: 16/07/2010			
Title	Date Effective	Revision Status	Set Review	Planned Review	Page
JHM300-ENV-PRO-007 - Site Shut Down Procedure	20/7/2010	1	3 year	01/01/2013	1 of 6

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Title	Date Effective	Revision Status	Set Review	Planned Review	Page
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1. PURPOSE

John Holland Group (JHG), Isaac Plains Mine shall;

- Monitor and appropriately manage dust emissions as a result of mining operations.

2. SCOPE

This document outlines the procedure for site shutdown at Isaac Plains based on:

- Continued elevated¹ dust monitoring results obtained from various monitors located between the Isaac Plains Coal Mine and the Moranbah Township.

This procedure must not be implemented by any site personnel without the involvement of the John Holland Environmental Representative.

3. BACKGROUND

1. Amendment to the Environmental Authority

On the 20th April 2010 DERM approved an amendment to the Environmental Authority (EA) which allowed for an increase in ROM coal production and the operation of a dragline at the IPCM. A requirement of the new EA, under Condition B3 is that:

“.....the environmental authority holder must submit to the administering authority a site shut-down procedure in the event of significant and sustained adverse meteorological conditions which may result in elevated dust emissions in the direction of the Moranbah township and be based on trends from background and/or ongoing monitoring results in condition B3.”

2. Significant or Sustained Adverse Meteorological Condition

JHG has defined a significant and sustained adverse meteorological conditions to be, any meteorological condition which:

- Increases or is likely to increase levels of dust, as a result of mining operations and meteorological conditions, above the levels deemed acceptable in Condition B2 of the EA, at any dust monitoring location between the Isaac Plains Coal Mine and the Moranbah Township for an extended period of time.

1* Elevated is defined as dust levels above EA limits detailed in Condition B2 and section 3 Monitoring, of this document.

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3. Monitoring

Dust

A DRX aerosol dust monitoring station is located between the mining operation and the Moranbah Township. This monitor operates 24hrs/day, relaying real time data back to a data management system (DMS). The DMS determines compliance with dust levels and sends an exceedence alarm back to the Environmental Representative when elevated dust levels are experienced. As per Condition B2 of the EA, particulate matter (PM) concentration limits which will trigger this procedure are:

- a) PM_{10} = 50 micrograms per m^2 over a 24hr average.
- b) $PM_{2.5}$ = 25 micrograms per m^2 over a 24hr average.
- c) TSP = 90 micrograms per m^2 annual average.

Meteorological Monitoring

Monitoring of meteorological conditions is primarily undertaken through the Isaac Plains Coal Mine on site weather station. Real time meteorological conditions such as, wind speed and wind direction are relayed back to a website and can be viewed remotely via the internet.

4. PROCEDURE

The following outlines the trigger, action and response for this procedure.

Trigger

1. JHG Environmental Representative (ER) receives notification through the dust management system of continued elevated dust levels as a result of mining operations, from the DRX aerosol dust monitor located between operations and the Moranbah Township.
2. ER to confirm elevated dust levels are a result of mining operations by reviewing wind direction and wind speed through the Isaac Plains on site weather station. This will also be determined through a visual inspection of the monitor where possible.

Action

1. Once confirmed, ER to advise the Site Senior Executive (SSE). SSE to initiate a site shutdown of all dust generating operations identified as contributing to elevated dust results.
2. Production Superintendent to identify the source of generation and deploy additional dust management practices to reduce dust lift off.

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3. After operations have been shutdown and recorded dust levels decrease, isolated individual operations can restart, keeping note of dust impacts through the real time dust management system.
4. If after a complete shutdown of all operations and implementation of additional dust measures, monitoring still indicates elevated dust levels, it will be determined that elevated results are not associated with mining operations. Operations will subsequently restart with key areas of fleet returning to operations.

Response

The ER will record the environmental incident through the John Holland incident reporting process and advise the DERM as required.

The ER and Production Superintendent will investigate the possible cause/s for the elevated dust levels and implement appropriate measures to reduce the possibility of a reoccurrence.

Everyone on-site has a responsibility to report any incidents or emergencies that may impact upon the receiving environment.

5. COMMUNICATION / TRAINING

All Shift Supervisors will advise work crews of this procedure.

All site inductions cover the environmental responsibilities of site employees, contractors and sub contractors including dust management requirements and the reporting of environmental incidents.

In addition, JHG and its major contractors shall keep relevant employees up to date on key management requirements.

6. REFERENCES

-  *Environmental Protection Act 1994*
-  *Environmental Protection Regulation 2008*
-  Environmental Management Plan (May 2010), Isaac Plains Coal Mine
-  Environmental Authority Number MIN100329505
-  Plan of Operations – 1 December 2009 to 1 December 2010, Isaac Plains Coal Mine (ML70342)

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7. RECORDS

All records associated with the Site Shut Down Procedure will be maintained and stored in accordance with the John Holland systems.

Records relating to this standard shall be maintained in accordance with JHG's Document Management Standard.

8. RECORD OF REVIEW

Rev	Date	Revision description	By	Check	Approved
A	22/12/09	Draft	ME	SG	
1	01/01/10	Rev 1	JB	SG	
2	1/07/10	Rev 2 – complete document change to encompass site shutdown not just dragline	L.Cini	C.Farrington P. Nobes IPCM	C.Farrington – SSE P. Nobes - IPCM

RTI DL RELEASE - EHP

6. 101209_Re Site water information - IPCM.txt

From: Lynden.Cini@jhg.com.au
Sent: Thursday, 9 December 2010 10:05 AM
To: Wright Glen
Subject: Re: Site water information - IPCM

Attachments: Water Balance Information.xls; Site water SITREP 9 Dec 10 DERM.xlsx

Glen,

This is the best I can do with short notice. The attached is a slight variation to your original spreadsheet for internal use. Please feel free to give me a call if you would like to discuss. I will be off site for the rest of the working week. Back on deck monitoring water levels Saturday - midday.

Regards

Lynden Cini
Environment and Community Officer
John Holland Group Pty Ltd
Isaac Plains Coal Mine - Peak Downs Highway (PO Box 181), Moranbah QLD 4744
Ph +61 7 30042021 sch4p3(3) 1061 the protection of an individuals right to privacy
> Lynden.Cini@jhg.com.au | ü www.johnholland.com.au
P Please consider the environment before printing this e-mail

"Wright Glen" <glen.wright@derm.qld.gov.au>
06/12/2010 03:21 PM
To <Lynden.Cini@jhg.com.au>
cc
Subject Site waterinformation - IPCM

Dear Lynden

I refer to our discussions today regarding the impacts of the recent rainfall and flooding on your mining operations, please find the attached spreadsheet for completion in relation to water storage details and current water management arrangements on site for the current 2010-2011 wet season. This information will assist DERM to understand the capacity of your site water management systems and any ongoing requirements on your site in relation to water management. It will also provide a basis for interaction about water related issues that may arise during the wet season, and beyond.

To accompany this information, please provide a copy of the most recent review of your Water Management Plan, required to be undertaken as per 1 November 2010 in accordance with the conditions of your Environmental Authority. If your site is yet to complete this review it must be undertaken immediately. Please provide the completed spreadsheet and Water Management Plan review by COB 10 December 2010.

If you have any questions in relation to this email please feel free to contact me on (07) 4980 6200.

Kind Regards

Glen Wright

Senior Environmental Officer, Environmental Services - Mining

Telephone: (07) 4980 6200, Fax: (07) 4982 2568

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www.derm.qld.gov.au

Department of Environment & Resource Management

99 Hospital Road, Emerald, Qld, 4720

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<<Water Balance Information.xls>>

+-----+

Think B4U Print

1 ream of paper = 6% of a tree and 5.4kg CO₂ in the atmosphere

3 sheets of A4 paper = 1 litre of water

+-----+

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Isaac Plains Site Water SITREP & Risk Management Register

Water Storage	Receiving water the water storage will report to if a release occurred.	Storage Capacity (ML)	Current volume of stored water (ML)	Current available storage (ML)	Current Water Quality				Total Combined Water Storage Capacity on Site (ML)	Total volume of combined stored water on Site (ML)	Total volume of Combined current storage available (ML)	Actions required	
					Electrical Conductivity (uS/cm)	pH	Suspended Solids (mg/L)	Sulphate (SO ₄ ²⁻) (mg/L)					
EA discharge limits					1500	6.5 - 9.0	80th %ile of upstream background sites	1000					
Release Dam 1	Smoky Creek	205	141	64	912	7.23	32	138					RD1 meets discharge water quality limits. Option to discharge at next flow event or divert to S2 North pit via S2 sed dam fill point if levels increase to critical. Survey to continue to monitor levels closely over the coming 5 days. Contingency plan approved by IPCM & JH management - If additional 50+mm of rain falls between now and finalisation of S1 pit (expected to be finalised within the next 10 days), pumping will begin from RD1 into S2 pit.
Release Dam 2	Billy's Gully	148	46	102	1600	8.99	11	115	469	303	166		No action required at this stage - continue to monitor levels
S2 Sed dam	No discharge dam - RD2	116	116	0	3200	8.77	15	130				S2 Sed Dam augmented 7/12/10 (small scale earth works - no increase to disturbance within overall footprint) to increase total capacity, next survey 10/12/10 to identify new capacity. All water carts currently filling from this point, working towards reducing current volume. Additional pipe infrastructure relocated to de-water into S2 North pit if required. Survey to continue to monitor levels closely over the coming 5 days.	
S1 pit	No discharge structure	1100	0	1100	-	-	-	-	1569	303	1266	Currently active pit. Once operations have ceased, this pit can be utilised for alternate storage. With sufficient pipe infrastructure all critical storages / pits can be diverted into S1. Operations to be finalised shortly.	

Interim Report on
Stability Assessment

Isaac Plains Final Landform
Isaac Plains Coal Mine
Peak Downs Highway
Moranbah

Prepared For
John Holland Group Pty Ltd

Project 74605.00
22 December 2010

Integrated Practical Solutions



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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached figures and diagrams have been checked and reviewed for errors, omissions and inaccuracies.

Signature	Date
Author	
Reviewer	



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Appendix A: About this Report

Appendix B: Galena Geotechnical Diagrams

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Interim Report on Stability Assessment

Isaac Plains Final Landform

Isaac Plains Coal Mine, Peak Downs Highway, Moranbah

1. Introduction

1.1 Scope of Work

This report presents the results of a stability assessment carried out for the proposed final landform at Isaac Plains Coal Mine, Peak Downs Highway, Moranbah. The assessment was undertaken at the request of John Holland Group Pty Ltd.

It is understood that an assessment of the geotechnical and erosivity stability of the final landform, including the final void, is required with reference to the relevant *Queensland Mining Guidelines*, in order to meet the minimum mine closure conditions. It is further understood that "Guideline 18: Rehabilitation requirements for mining projects" (Queensland EPA) was to be used as the primary review document, although reference should also been made to other relevant documents (as detailed in Section 1.2 below).

The aim of the assessment was to review the relevant documents against the proposed final landform and to provide comment on:

- Erosivity of proposed final landform, any requirement for mitigation including conceptual approach;
- Geotechnical issues, mainly stability, of the final void lowwall and highwall slopes;
- Any significant knowledge gaps.

The assessment that follows includes the entire proposed landform within the mine lease boundary at its closure, including:

- In-pit and out-of-pit dumps;
- Final void including lowwall and highwalls;
- Infrastructure and dams.

It should be noted that flood levees were not included as part of this interim final landform assessment because it is understood that the area surrounding Smoky Creek and the final levees are still in preliminary final landform design phase.

1.2 Reference Documents

This stability assessment of the final landform is based on information provided by John Holland Group Pty Ltd and their third party consultants. The following documents were provided to DP, by John Holland Group Pty Ltd, for review:

- Environmental Authority (Mining Activities) Non Code Compliant Level 1 Mining Project Permit Number: MIN100329505 - Isaac Plains Coal Mine, ECOACCESS Environmental Licences & Permits, April 2010, Condition F12;
- Reference Site Monitoring and Development of Draft Rehabilitation Completion Criteria for Isaac Plains Coal Mine, AXM Consulting;
- Isaac Plains North (Interim) Final Landform Analysis, Echelon Mining Services, October 2010;
- Isaac Plains Coal Project Central Queensland Report of Assessment of Geotechnical Conditions, Insite Geology Pty Ltd, November 2004;
- Environmental Geochemistry Assessment of the Isaac Plains Project, Geo-Environmental Management Pty Ltd, February 2005;
- Isaac Plains Coal Management Pty Ltd, Initial Advice Statement, Integrated Isaac Plains Project, September 2006, Matrix+ Consulting Pty Limited.

Government documents reviewed and works referenced against include:

- Mining Guideline 18: Rehabilitation Requirements for Mining Projects, Environmental Protection Agency, June 2007.
- Department of Minerals and Energy Technical Guidelines, January 1995:
 - o Technical Guideline 03: Land Suitability Assessment Techniques.
 - o Technical Guideline 04: Determination of Post-Mining Land Use.
 - o Technical Guideline 21: Tailings Management.
 - o Technical Guideline 24: Open Pit Rehabilitation.
 - o Technical Guideline 27: Geotechnical Slope Stability.
 - o Technical Guideline 28: Erosion Control.
 - o Technical Guideline 33: Minesite Decommissioning.
- Strategic Framework for Mine Closure, ANZMEC.
- Planning for Integrated Mine Closure: Toolkit, ICMM.

In addition, John Holland Group Pty Ltd and their third party consultants provided DP with the proposed final landform model and current landform design files, that this assessment was based on.

2. Site Description

Isaac Plains Coal Mine is located approximately 7km east of the township Moranbah, in Central Queensland (refer to Figure 1 following). The mine site is orientated roughly in a north south direction with three final landform open cut pits, N1 / N2, S2 and S3. Mining is in an easterly direction and the proposed final landform will be an accumulation of dragline and truck and shovel operations. The mining lease gently slopes to the west with Smoky Creek running approximately through the middle of the site. A small creek, Billys Gully, runs across the southern edge of the mine site.

Isaac Plains Coal Mine is co-owned by Vale Australia Pty Ltd (50%) and IP Coal Pty Ltd (50%), and is operated by John Holland Group Pty Ltd. The location of Lot ML70342 covering Isaac Plains Coal Mine and surrounding mining leases and land titles is shown in Figure 2 below.

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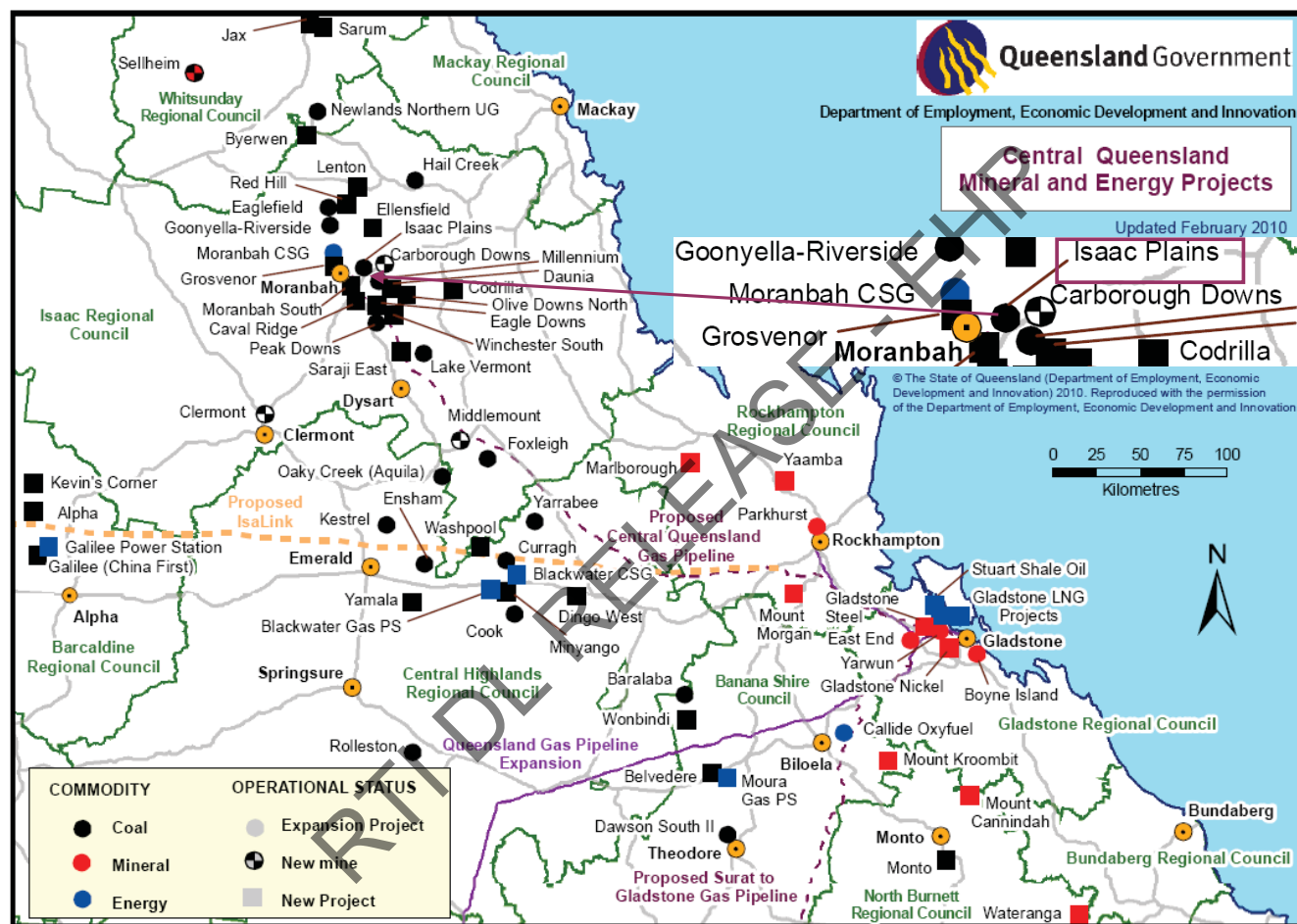


Figure 1: Location of Isaac Plains Coal Mine¹

¹ Plan adapted from "Queensland Government Mineral and Energy Projects Website".

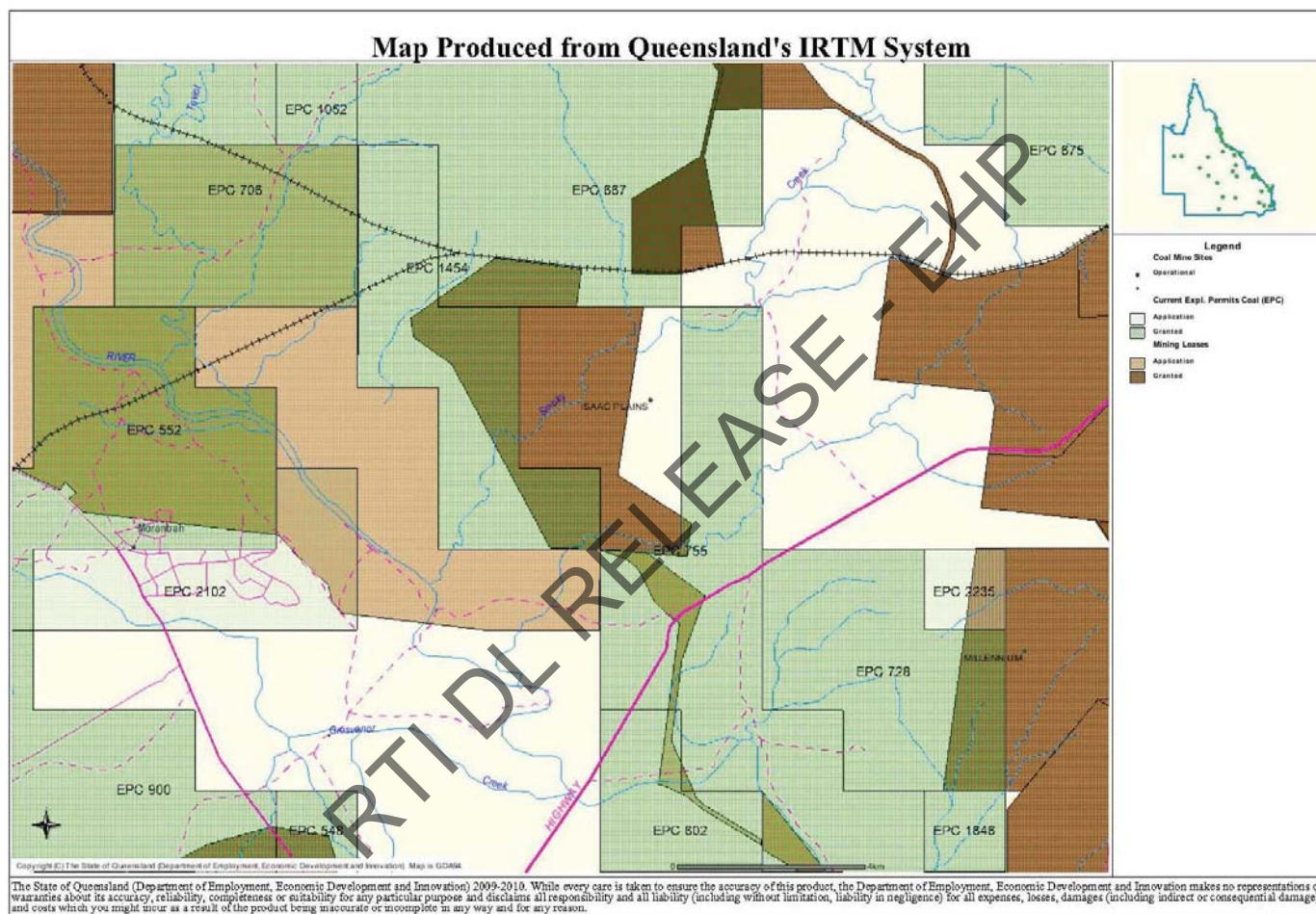


Figure 2: Mining and Exploration Lease around Isaac Plains Coal Mine

2.1 Climate

Isaac Plains Coal Mine is located in the warm subtropics of Queensland, generally experiencing hot summers (average daily maximum of 34.1°C in December) and warm winters (average daily maximum of 23.8°C in June and July). The area exhibits low to moderate rainfall with an average annual rainfall of 592.8mm and high evaporation rates with an average annual evaporation of 2337mm.

Approximately 70% of all rainfall occurs as intense storms and low depression (ex-cyclone) rain in summer and early autumn (December through to March). As such, water surpluses and localised flood events are common during wet summer months. However, it should be noted that the annual rainfall is highly variable and droughts are common.

A summary of long term climatic statistics obtained from the Bureau of Meteorology Station website (www.bom.gov.au) for the weather station at the Moranbah Water Treatment Plant (weather station site number 034038) is provided in Table 1 below.

Table 1: Summary of Climatic Statistics

Month	Temperature		Rainfall		Mean Evaporation (mm)
	Mean Minimum (°C)	Mean Maximum (°C)	Mean (mm)	Mean Days of Rain *	
January	21.9	33.9	102.2	6.3	254
February	21.8	33.1	100.7	6.3	210
March	20.2	32.2	48.1	3.5	217
April	17.6	29.6	36.8	3.0	174
May	14.4	26.6	34.9	2.6	133
June	11.2	23.8	22.0	2.1	108
July	9.9	23.8	18.3	1.8	115
August	11.1	25.5	23.8	1.6	152
September	14.2	29.3	9.3	1.4	198
October	17.6	32.3	36.3	3.1	248
November	19.5	33.3	70.4	5.0	258
December	21.1	34.1	94.7	5.6	270
Annual Average	16.7	29.8	592.8	42.3	2337

* mean number of days of rain greater than or equal to 1mm

During the summer months high rainfall events are common, which often leads to significant surface runoff and therefore potentially increased erosion rates on bare unprotected slopes.

2.2 Geology

Isaac Plains Coal Mine lies on the northern part of the Permo-Triassic Bowen Basin. The economic coal seams are within the Rangel Coal Measures which consist predominantly of sandstones, siltstones, mudstones and coal. Isaac Plains Coal mines the 3.5m thick Leichhardt coal seam which splits into Leichhardt Upper and Leichhardt Lower in the north of the deposit – all of which form part of the greater Rangel Coal Measures. Figure 3 highlights the general stratigraphy at Isaac Plains Coal Mine.

The typical stratigraphic horizon at Isaac Plains Coal Mine consists of 2m to 5m of unconsolidated residual sediments (derived from Permian sediments) over Permian sandstones, siltstones and minor mudstones, above the Leichhardt coal seam. Limited Quaternary alluvium exists around Smoky Creek in the centre of the mining lease and a deep alluvial channel runs across the southern end of N1 Pit. The weathering horizon consists of generally clayey residual soil and extremely to slightly weathered Permian sediments. The depth of weathered profile can range from 7m to over 45m, averaging approximately 20m across the site². Groundwater levels recorded in exploration boreholes range from 20m to 35m from existing surface level³.

The Permian overburden horizon is a moderately weak to strong strength unit. Carbonaceous mudstone and siltstone can occur immediately below the coal seam and may be affected by shearing. Sandstones, siltstones and mudstones also occur in the floor of the Leichhardt coal seam.

On the mining lease at Isaac Plains Coal Mine, the Rangel Coal Measures dip easterly, with angles ranging from 4° to 14°. On the eastern edge of the deposit a major thrust system (The Isaac Thrust) exists. A major North-South trending fault splits the deposit to the north with a throw of up to 60m. Normal faults occur across the deposit with a North-North-East trending fault running down the middle of the mine.

² "Isaac Plains Mine (ML70342) Resource Statement, JB Mining Services Pty Ltd, December 2009.

³ "Isaac Plains Coal Project Central Queensland Report of Assessment of Geotechnical Conditions", Insite Geology Pty Ltd, November 2004.

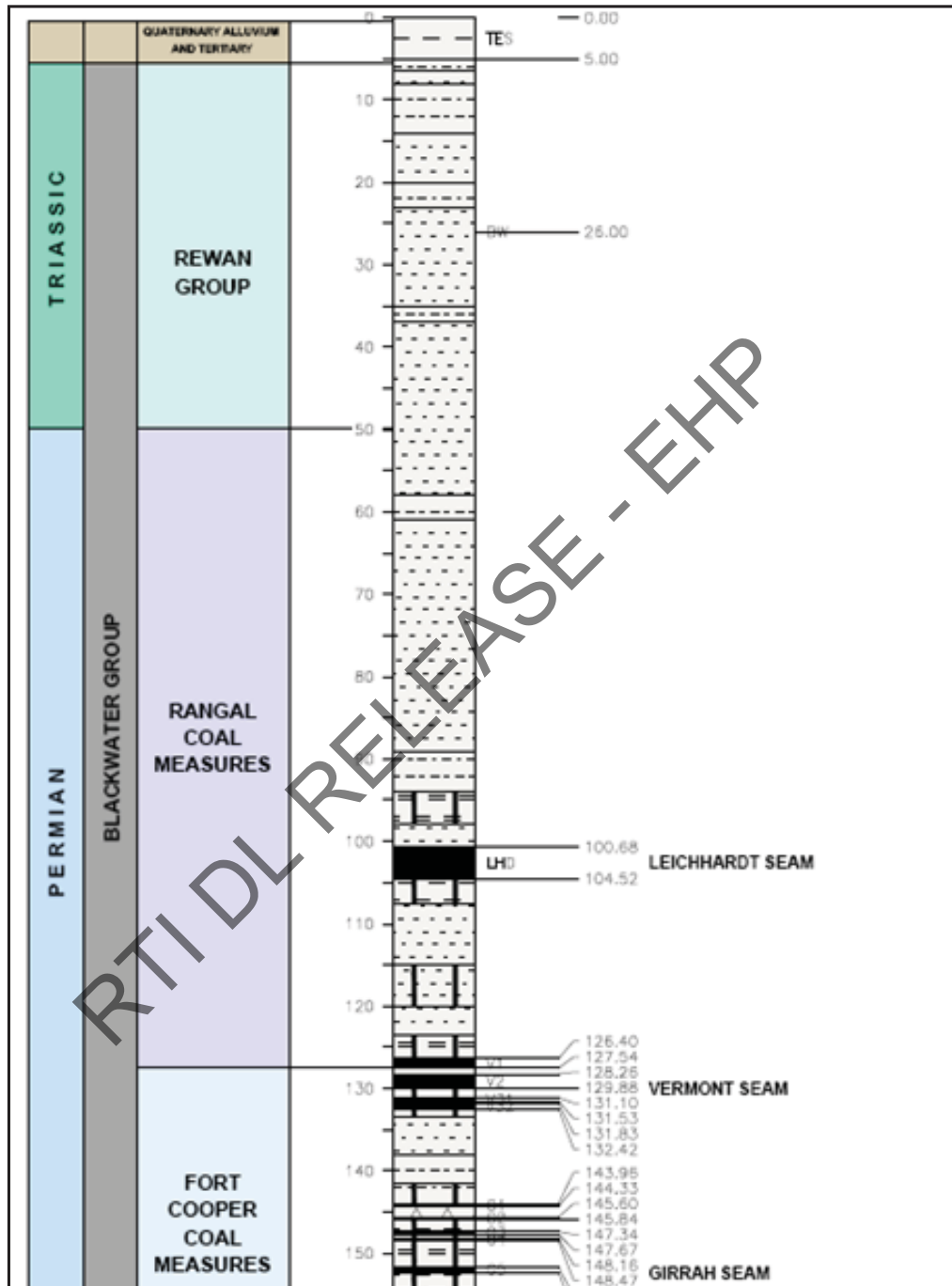


Figure 3: Stratigraphic Column at Isaac Plains Coal Mine⁴

⁴ Plan adapted from Isaac Plains Coal Management Pty Ltd.

2.3 Surface Hydrology

Isaac Plains Coal Mine is located in the catchment of the Isaac River and the majority of the site is located on historic floodplains that drain into two tributaries of the Isaac River – Smoky Creek and Billy's Gully (refer to Figure 4 below). Smoky Creek runs north-east to south-west roughly through the centre of the site towards the Isaac River. Billy's Gully runs roughly east to west through the southern end of the site, also towards the Isaac River.

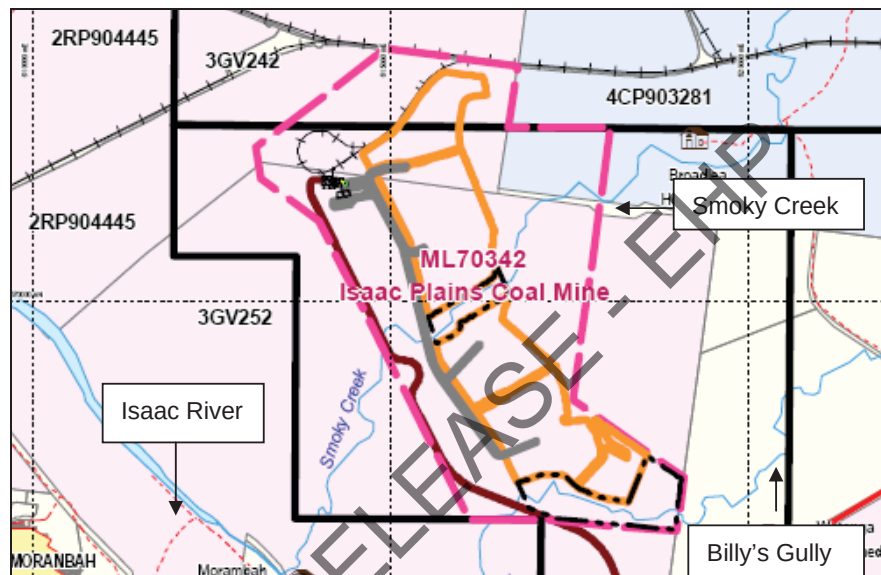


Figure 4: Major Watercourses in Relation to Isaac Plains Coal Mine⁵

Anecdotal evidence from a site inspection suggests that both Smoky Creek and Billy's Gully breach their banks after heavy rainfall within the upstream catchment area. Currently levees prevent such minor and major flood events from allowing flood waters to enter the adjacent pits.

2.4 Soil Properties

The following table is a summary of noteworthy laboratory results, with regards to erosion potential, obtained from both the AXM Consulting report (August, 2010)⁶ and the Geo-Environmental Management Pty Ltd report (February 2005)⁷ in relation to the material discussed above.

⁵ Plan adapted from "Initial Advice Statement – Integrated Isaac Plains Project", Matrix Consulting, September 2006.

⁶ "Reference Site Monitoring and Development of Draft Rehabilitation Completion Criteria for Isaac Plains Coal Mine", AXM Consulting, August 2010.

⁷ "Environmental Geochemistry Assessment of the Isaac Plains Project, Bowen Central Coal Joint Venture", Geo-Environmental Management Pty Ltd, February 2005.

Table 2: Summary of Soil Properties from AXM Consulting (August, 2010)⁸ and Geo-Environmental Management Pty Ltd (February 2005)⁹ reports

Lithology Sampled	Mine Location Sampled	pH *	Emerson Class *	Sodium Adsorption Ration (SAR)
Topsoil – Brown clayey sand	Unmined plain	7	3	-
Topsoil – Brown silty clay	Unmined plain	8.4	3	-
Dark brown medium clay	Unmined plain	8.5	3	-
Light brown gravelly silty clay	Unmined plain	5.4	3	-
Topsoil – Dark brown self-mulching medium clay	N1 external dump rehabilitation site	8.9	2	-
Topsoil - Brown sandy clay	N1 external dump rehabilitation site	8.6	2	-
Sandstone	Boreholes within the proposed pit footprints	-	-	9
Sandstone		-	-	9
Sandstone		-	-	10
Siltstone		-	-	11
Siltstone		-	-	14
Siltstone		-	-	5
Mudstone		-	-	15
Mudstone		-	-	10
Carbonaceous Siltstone		-	-	13
Carbonaceous Mudstone		-	-	12
Carbonaceous Mudstone		-	-	9

* averaged from three samples taken between 0m and 0.6m depth

With reference to Brisbane City Council eForms Technical Note 13, Emerson class values can be used to assess soil dispersion, as follows:

- Emerson Class 1 or 2 – Very high potential for erosion and environmental harm to all waters;
- Emerson Class 3 – High potential for erosion. High potential for environmental harm if disturbed;
- Emerson Class 4 – Medium potential for erosion. Medium potential for environmental harm for creek systems;
- Emerson Class 5 – Medium potential for erosion. Medium potential for environmental harm if disturbed;
- Emerson Class 6 – Medium potential for erosion. Medium potential for environmental harm if disturbed;
- Emerson Class 7 or 8 – Low potential for erosion by dispersion processes. Erosion may occur by physical action (i.e. raindrop impact or flowing water).

⁸ "Reference Site Monitoring and Development of Draft Rehabilitation Completion Criteria for Isaac Plains Coal Mine", AXM Consulting, August 2010.

⁹ "Environmental Geochemistry Assessment of the Isaac Plains Project, Bowen Central Coal Joint Venture", Geo-Environmental Management Pty Ltd, February 2005.

Likewise, the SAR value can be used to characterise a soils sodicity and likely dispersion characteristics as follows:

- SAR = 0 to 5 – Non sodic and non dispersive;
- SAR = 5 to 15 – Moderately sodic and slightly dispersive;
- SAR = >15 – Highly sodic and highly dispersive.

With reference to the above results and from a site inspection undertaken by Douglas Partners geo-professionals on 8 December 2010, the near surface soil conditions, (upper 0.6m) that could be exposed to erosion, generally consist of:

- moderately dispersive silty and sandy clays across the unmined proportions of the mine site, across the rehabilitated sections of N1 external dump face, the flood levee and dam walls;
- moderately dispersive sand, gravel and cobbles in the lowwall, formed from the dumped Permian overburden material. The lowwall also had large sections of dumped weathered alluvial and unconsolidated sediment overburden material consisting of generally moderately sandy clays;
- moderately dispersive alluvial and unconsolidated sediment consisting of silty and sandy clays over moderately dispersive interbedded Permian sedimentary rocks (sandstone, siltstone and mudstone etc.) forming the highwall.

It should be noted that the sand, gravel and cobbles formed from the dumped Permian overburden material is likely to weather to clay sand or sandy clay in time.

3. Final Landform Criteria

3.1 General Criteria

Four general rehabilitation goals are required for the rehabilitation requirement of mining projects at end of mine life. These goals as stated in Mining Guideline 18¹⁰ are:

- Safe to humans and wildlife;
- Non-polluting;
- Stable; and
- Able to sustain an agreed post-mining land use.

The aim of this project is to progress towards meeting the rehabilitation goals at the end of mine life for Isaac Plains Coal Mine, with specific respect to the long-term stability of the proposed final landform. There are three possible outcomes for achieving the required rehabilitation goals for different post mine land uses at Isaac Plains Coal Mine: generally acceptable, may be acceptable and rarely acceptable. A number of strategies may be developed to achieve the acceptable outcomes according to the Environmental Authority Permit Conditions to ensure post mine land use as required. For stable landforms the requirements to meet an acceptable outcome may include battered slopes with vegetative cover, to battered moderate slopes with little vegetation in the upper slopes of the final void.

¹⁰ "Mining Guideline 18: Rehabilitation Requirements for Mining Projects", Environmental Protection Agency, June 2007.

3.2 Specific Final Landform Criteria

The final land use and rehabilitation approval schedule defined in the Environmental Authority Permit: MIN100329505¹¹, with reference to the existing conceptual design, is as follows:

Table 3: Taken from Table 17, Environmental Authority (Mine Activities) Permit MIN100329505 for Isaac Plains Coal Mine

	Disturbance type					
	Residual Voids	Over-burden Emplacement	Sediment / Supply Dams	Infrastructure	ROM area	Road(s) and tracks
Projective surface area (ha*)	13	241.3	183	40.1	15.6	32.14
Pre-mine land use	Grazing	Grazing	Grazing	Grazing	Grazing	Grazing
Post-mine land use	Water storage	Native Ecosystem	Water storage	Grazing	Grazing	Grazing or to remain as farm access upon agreement with landholder
Post-mine land capability classification	V	V	V	II-V	II-IV	III or V
Projective cover range (%)	N/A	70%	N/A	70%	70%	N/A

With reference to the table above, the post mine land capability classification ranged from Class 2 to Class 5. Technical Guideline: Land Suitability Assessment Techniques define these categories as follows:

“Class 2

Agricultural - Suitable Land with minor limitations – Land which is suited to a proposed use but which may require minor changes in management to sustain the use.

Conservation - These areas are suited to conservation use in that a significant component of the pre mining conservation values can be restored post mining. There will however be some loss in conservation values where soil terrain or hydrological post-mining conditions may inhibit the full replication of the pre-mining values.

¹¹ “Environmental Authority (Mining Activities) Non Code Compliant Level 1, Mining Project, Permit Number: MIN100329505 – Isaac Plains Coal Mine”, ECOACCESS Environmental Licenses & Permits, April 2010.

Class 3

Agricultural - Suitable Land with moderate limitations - Land which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use.

Conservation - These lands contain significant conservation values pre mining, however, restoration of all of these values may not be feasible. These areas could however, be restored to a form of conservation use which provides alternative conservation benefits.

Class 4

Agricultural - Marginally Suitable Land - Land which is marginally suited for a proposed use and would require major inputs to ensure sustainability. These inputs may not be justified by the benefits to be obtained in using the land for the particular purpose and is hence considered presently unsuited.

Conservation - These lands contain limited conservation value pre mining and/or are incapable of being effectively restored post mining to any alternative conservation use which provides similar benefits. The area could however be restored to provide a stable form of use which does not impact on surrounding conservation values.

Class 5

Agricultural - Unsuitable Land with extreme limitations - Land which is unsuited and cannot be sustainably used for a proposed use.

Conservation - These lands contain no significant conservation values.

Where a range of land use options is being considered, a class ranking should be applied to each type of use."

According to the Determination of Post-Mining Land Use Technical Guideline 4, post mining land use for water storage areas will need to take into account all water quality and quantity with potentially separate studies for hydrology and hydrogeology conditions. For the assessment of the final void landform assumptions have had to be made concerning the recovery of the groundwater post-mining however this will have to be verified through groundwater studies once the final void landform is sufficiently defined for the closing of Isaac Plains Coal Mine.

According to the Environmental Authority Permit Conditions applied to Isaac Plains Coal Mine all areas significantly disturbed by mining activities must be rehabilitated to a stable landform in accordance to Figure 4 (Landform Design Criteria), as follows:

Table 4: Landform Design Criteria taken from Table 18, Environmental Authority (Mine Activities) Permit MIN100329505 for Isaac Plains Coal Mine

Disturbance Type	Maximum Slope Range %	Projected Surface Area (ha)
Waste Rock Dump – external wall	15% (8.5°)	150
Waste Rock Dump – low wall	73% (36°)	92
Boxcut Batter	100% (45°)	17

The Environmental Authority (Mine Activities) Permit also indicates the residual void must comply with the following outcomes:

- a) residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within the environmental authority; and
- b) residual voids must comply with Table 5 (Residual void design), as follows:

Table 5: Residual void design taken from Table 19, Environmental Authority (Mine Activities) Permit MIN100329505 for Isaac Plains Coal Mine

Void Identification	Void high wall – competent rock slope (%)	Void low wall – incompetent rock slope (%)	Void maximum surface area (ha)
N1	275% (70°)	73% (36°)	12.3
N2	275% (70°)	73% (36°)	6.9
S1	275% (70°)	73% (36°)	1.1
S2	275% (70°)	73% (36°)	11.9
S3	275% (70°)	73% (36°)	4.8

4. Methodology

4.1 Erosion

A final landform footprint and gridded digital elevation model (DEM) was created from the final landform files provided by Echelon Mining Services (provided via email on the 19th November 2010).

Erosion assessment for the final landform design was made using the Revised Universal Soil Loss Equation (RUSLE) following the method detailed in Witheridge (2008)¹², which calculates annual erosion rates by:

$$A = R \times K \times LS \times C \times P$$

Where:

- A = annual soil loss due to erosion (tonnes/ha/yr)
- R = rainfall erosivity factor
- K = soil erodibility factor
- LS = topographic factor derived from slope length and slope gradient
- C = cover and management factor
- P = erosion control practice factor

¹² Witheridge, G. "Best Practice Erosion & Sediment Control", International Erosion Control Association (IECA), Australasia, November 2008.

4.1.1 The R-factor

The R-factor is determined from the following formula:

$$R = 164.74 (1.1177)^S S^{0.6444}$$

Where S is the 2 year ARI [mm/hr], 6 hour average storm intensity.

A map of rainfall erosivity (R-factor) and its monthly distributions for selected locations, across Australia have been determined by CSIRO (2001)¹³.

4.1.2 The K-factor

The K-factor is a numeric representation of the ability of soils to resist the erosive energy of rain. K-factors for a number of Australian soil types have been determined by Rosewell (1993)¹⁴.

4.1.3 The LS-factor

The LS-factor is a numerical representation of the length-slope combination. The LS-factor was obtained from digital terrain analysis using SAGA (System for Automated Geoscientific Analyses <http://www.saga-gis.org>, Version: 2.0.5 Copyrights (c) 2005-2009 by Olaf Conrad) terrain evaluation software incorporating with the final landform data provided by the client.

4.1.4 The C-factor

The C-factor measures the combined effect of all the interrelated vegetation and rock cover and erosion management variables. It also represents non-structural methods for controlling erosion. C-factors were obtained from tables published in Witheridge (2008) and published C-factors for rock mulch cover in Guidelines for the use of the Revised Universal Soil Loss Equation, Chapter 5¹⁵.

4.1.5 The P-factor

The P-factor measures the combined effect of all support practices and management variables. It also represents structural methods for controlling erosion. The P-factor was obtained from Table E11 in Witheridge (2008).

¹³ CSIRO "Prediction of Sheet and Rill Erosion over the Australian Continent, Incorporating Monthly Soil Loss Distribution", CSIRO, May 2001.

¹⁴ Rosewell, C. "SOLOSS A Program to assist in the selection of management practices to reduce erosion", Technical Handbook No. 11, NSW Soil Conservation Service, ISBN 0 7305 5931 9.

¹⁵ Toy, T.J. & Foster G.R. "Guidelines for the Use of the Revised Universal Soil Loss Equation (RUSLE) on Mined Lands, Construction Sites and Reclaimed Lands", The Office of Technology Transfer Western Regional Coordinating Center, August 1998.

4.2 Geotechnical

The Isaac Plains Coal Mine proposed final void runs north-south as Pits N2/N1, S2 and S3, refer to Figure 5 below. Proposed final landform designs for the final void and external dumps were supplied by Echelon Mining Services. Pit N1 is a dragline and truck and shovel excavation exposing the Leichhardt coal seam up to 100m below surface. Pits S2 and S3 are wholly truck and shovel excavations providing shallower lowwall slopes and greater control over the final lowwall positions.

4.2.1 Review of Final Landform against Criteria

The currently proposed final landform highwall, lowwall and external dumps from design files received from Echelon Mining Services indicates the design has the following slopes:

Table 6: Isaac Plains Coal Mine Final Landform Design

Void Identification	Void Wall – competent rock slope	Void low wall – incompetent rock slope – Dragline Spoil	Void low wall – incompetent rock slope – Truck Shovel Spoil	Void low wall ramp – incompetent rock slope	Waste Rock Dump – External Wall
N1	100% (45°)	75% (37°)	36% (20°)	75% (37°)	15% (8.5°)
N2	100% (45°)	75% (37°)	36% (20°)	75% (37°)	15% (8.5°)
S2	100% (45°)	-	36% (20°) to 75% (37°)	75% (37°)	15% (8.5°) to 75% (37°)
S3	100% (45°)	-	36% (20°)	75% (37°)	15% (8.5°)

These values relate closely to the Environmental Authority Permit Conditions however in some areas the slope may be 37° as opposed to 36° and adjustment of the design can easily rectify this. There are minor areas along the lowwall in Pit N1 that are steeper than 36° which will require adjustment, (refer to Figure 6 below). Figure 6 also shows a small section of lowwall that can be rectified on the proposed final landform to meet the Environmental Authority Permit Condition F9 for geotechnical stability. External dump faces along the eastern face of Pit S2 where the dump toes onto natural surface require adjustment of the spoil slope to 8.5° from 20° in the south east and 37° in the south. For purpose of geotechnical stability analysis assessment a 36° slope has been assessed as opposed to the 37° which should be adjusted on the proposed final landform design.

The proposed final landform is an accumulation of Isaac Plains Coal Mine present topography and a proposed final void and dumps. With the present topography there are two stockpile slopes greater than 8.5° adjacent the rail loop (refer to Section 5.3 and Figure 8). It is assumed that these will be corrected for the final landform on future design revisions. Like the void wall nonconformities detailed above, it has been assumed that these will be rectified in the future design revisions and therefore has not been included in the final landform stability assessment.

4.2.2 Final Void

The proposed final void for Pits N2/N1, S2 and S3 were analysed using the limited equilibrium software Galena to determine Factor of Safety (FOS) for the proposed final void. Factor of Safety for a temporary slopes is 1.2 and the FOS for a permanently cut slope is 1.5¹⁶. The FOS for a section can also depend on any structure influencing the stability of the slope rather than just the strength of the intact rock mass. For the geotechnical stability analysis of the proposed final landform design the FOS was obtained assuming failure through intact rock without the influence of unfavourably orientated defects such as bedding, joints or faults. However, once the final void is defined for mine closure, structure will need to be considered in the stability assessments and pit wall slopes remediated to prevent large scale failures.

Technical Guideline 33: Minesite Decommissioning, suggests the incorporation of a hydrogeological model for mine closure that may highlight factors affecting the integrity of the final void, including geotechnical stability of the lowwall and ramp spoil. The Isaac Plains Project Revised Final IAS¹⁷, mentions additional groundwater studies and the aims "Determine the potential impacts of mining on the groundwater environment and groundwater users via conceptual modelling and empirical techniques. It is unlikely that advanced dewatering of the pit area will be required based on the aquifer characteristics of ML70342. Nevertheless, dewatering processes will be reviewed during this phase of the hydrogeological assessment for confirmation". A realistic estimate of the groundwater levels post-mining will be an important factor in the stability of the long term final void. Any inundation of the final void has the potential for influencing the stability of the slopes. The final void in-pit ramps meet the condition of providing safe access into an inundated final void particularly for use in emergency situations as applicable to Technical Guideline 33.

4.2.3 Tailings Management

The coal handling and preparation plant (CHPP) at Isaac Plains Coal Mine produces a waste by-product of coarse rejects and belt filter press fine dry tailings. The fine tailings processing allows for disposal of CHPP waste into cells within the spoil dumps rather than placement into a tailings dam. A mining operation plan at Isaac Plains Coal Mine for coal rejects management exists and addresses the design and disposal of all rejects into the spoil dumps¹⁸. Rejects are dumped in accordance to a placement risk assessment and geotechnical design which may stipulate the minimum required distance from the spoil dump face and minimum capping thickness above the cell. Ensuring the placement of tailings in line with the coal rejects and management plan throughout mine life, the influence of the co-disposal material within the spoil dumps should be minimised resulting in a reduced possibility of instability of the final void lowwall.

¹⁶ "Technical Guideline 24: Open Pit Rehabilitation", Department of Mineral and Energy, January 1995.

¹⁷ "Isaac Plains Coal Management Pty Ltd, Initial Advice Statement, Integrated Isaac Plains Project", Matrix+ Consulting Pty Limited, September 2006.

¹⁸ "JHQ-M1007-PLN-MOP-CMP-001a Coal Rejects Management Plan".

4.2.4 Infrastructure

As stated in Table 3 areas of infrastructure require rehabilitation to the post-mining land use of grazing. According to Mining Guideline 18: Rehabilitation Requirements for Mining Projects this can be accomplished with the removal of all mining infrastructure at mine closure and the rehabilitation of the slope with re-shaping disturbed areas to resemble the surrounding landscape as a generally accepted outcome. As current infrastructure has not greatly altered the pre-mining landform, rehabilitation of the disturbed areas could be defined once mine closure planning has been finalised.

The post-mining use of the existing settlement dams has been stipulated as water storage in the Environmental Authority Permit Condition F4. As such, it is considered that their use, condition and long term stability (if required) will be managed by future grazing managers.

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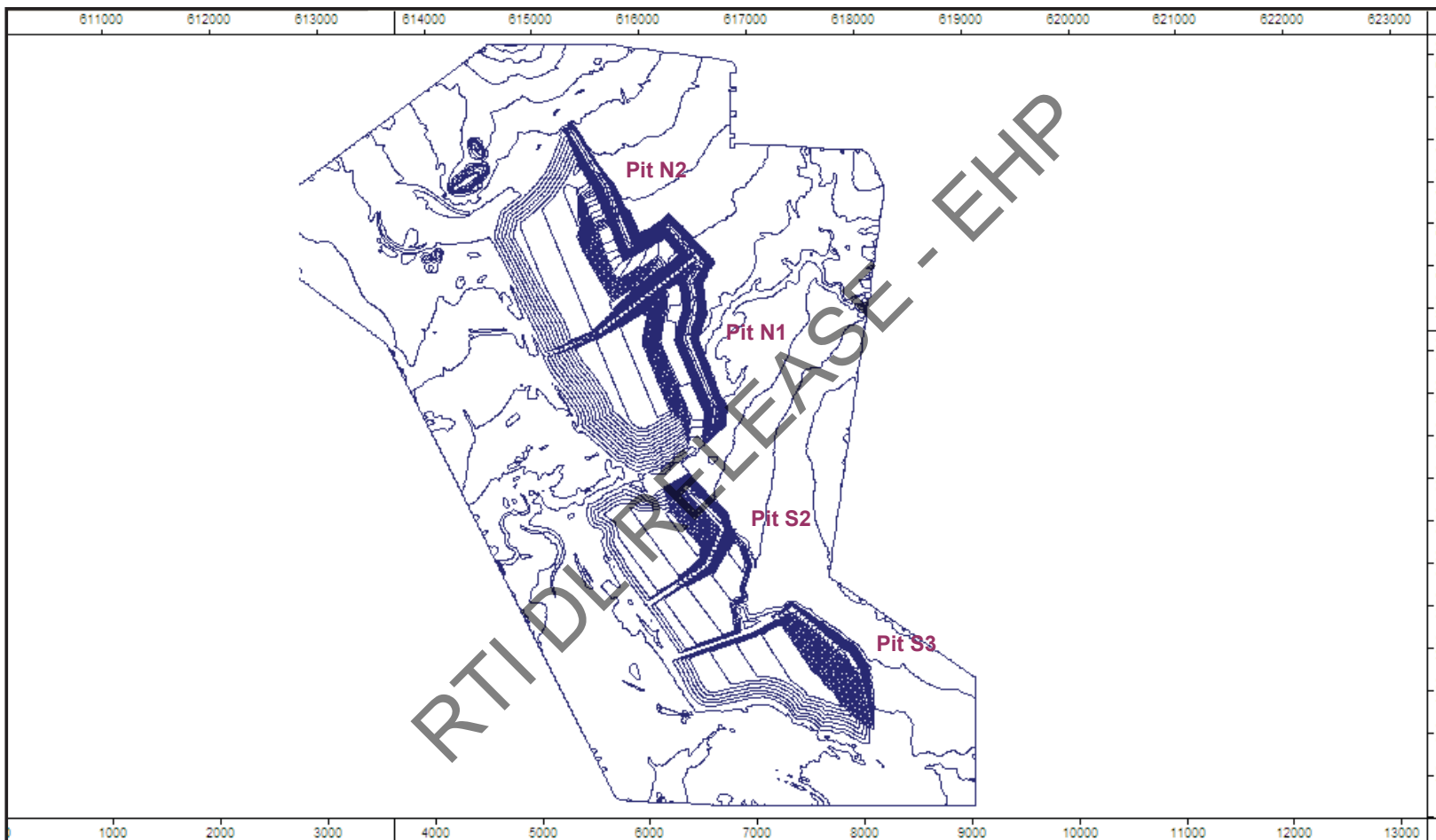


Figure 5: Final Landform of Isaac Plains Coal Mine - 5m Contours

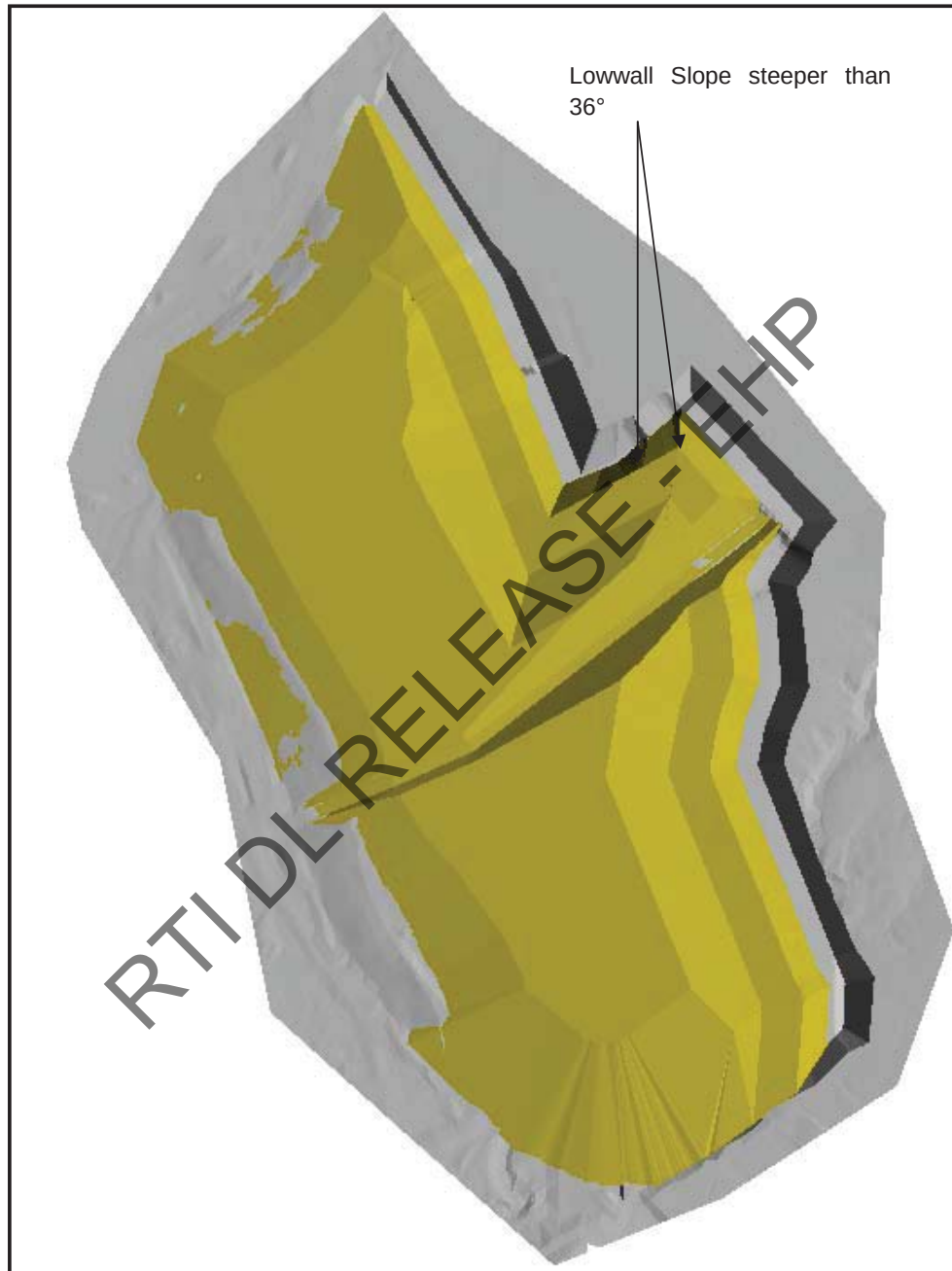


Figure 6: Pit N1/N2. Lowwall Slopes Greater than Closure Criteria¹⁹

¹⁹ Plan adapted from "Isaac Plains North (Interim) Final Landform Analysis", Echelon Mining Services, October 2010

5. Erosion Assessment

5.1 Erosion Assessment Criteria

With reference to Mining Guideline 18: Rehabilitation Requirements for Mining Projects, erosion rates not exceeding those on comparable unmined land in the same locality is “generally acceptable” whilst erosion rates higher than surrounding comparable unmined areas but with an appropriate maintenance program proposed “may be acceptable”.

In their Erosion Control document dated January 1995 DERM define the objective of sediment control as follows:

“To ensure that erosion rates on disturbed and rehabilitated land do not exceed those rates occurring on the site prior to mining or on comparable unmined land in the same locality.”

With reference to CSIRO (2001)²⁰ the ‘natural’ predicted hill slope erosion rate for the area is estimated to be in the order of 10 to 20 t/ha/yr.

It should be noted that the final landform design does not wholly have context in the natural surrounding landscape and as such some additional erosion as a result of the high and low walls could be expected. As such, it is anticipated that the long term sediment erosion control goal will be to control erosion rates outside of the final voids (i.e. excluding high and low walls) to a rate not exceeding those on comparable unmined land in the same locality and to contain the higher erosion rates to within the final voids, using the water storage area as an erosion sediment trap negating further any impact on the surrounding environment (as detailed further in Section 6, below).

5.2 Erosion Assessment Assumptions

In order to reach the minimum state requirements detailed in Section 5.1 above, and to meet the minimum proposed rehabilitation completion criteria as detailed in the AXM Consulting report²¹, the following has been assumed:

- once an overburden dump has reached its maximum dump level height, it will be pushed to the proposed final landform grade (maximum 8.5° for the external slopes);
- once the landform is grade compliant it is assumed it will be covered by a combination of; topsoiling, seeding and possibly hydro-mulching and rock mulching in order to established the required self sustaining native ecosystem with a ground cover greater than 70% (refer to Section 3) and so that no ground is left bare and therefore subjected to unnecessarily high erosion rates;
- at the point when mining is discontinued at the site it is assumed that all areas proposed for future grazing will also be covered by a combination of; topsoiling, seeding and possibly hydro-

²⁰ CSIRO “Prediction of Sheet and Rill Erosion over the Australian Continent, Incorporating Monthly Soil Loss Distribution”, CSIRO, May 2001.

²¹ “Reference Site Monitoring and Development of Draft Rehabilitation Completion Criteria for Isaac Plains Coal Mine”, AXM Consulting, August 2010.

mulching and rock mulching, so that no bare ground is exposed and subjected to unnecessarily high erosion rates and that long term ground cover of greater than 70% can be achieved;

- the lowwall, highwall and pit floor will be graded to the levels proposed however will remain untopsoiled and unseeded as this area is proposed for water storage;
- the lowwall will be battered to the proposed grades and all areas of alluvial and unconsolidated sediment spoil will be covered with Permian spoil to act as pseudo rock mulch.
- the non compliant regions of the final landform (refer to Section) are merely an oversight by the client and that the actual final land form design will comply to the Environmental Authority: MIN100329505 for Isaac Plains Coal Mine.

It should be noted that the erosion quantity values generated by this assessment are estimates only. With reference to DERMs Erosion Control document dated January 1995:

"Because of the high variability in rainfall conditions (both as individual rainfall events and in seasonal conditions) erosion itself is prone to extremely high variation. Accordingly, erosion needs to be measured over a medium to long term period (perhaps 10 years or longer) to determine applicable erosion rates with some confidence."

As such the following assessment can only be used as a start point only and a longterm comprehensive sediment erosion monitoring regime will be required for the site in order to establish 'true' like sediment erosion loss rates for rehabilitated sites, 'natural' and grazing landscapes.

It should also be noted that the following assessment accounts for sheet water erosion only. It does not account for gully erosion (which may form on the proposed landform if left unvegetated or with poor surface water drainage design and management) or wind erosion.

5.3 Erosion Assessment Models

The proposed final landform model provided by the client was input into SAGA, to generate the LS values (given in Section 5.3 below) as well as to generate several figures which highlight the areas of highest slope and stream power, which have the potential to generate high localised erosion rates. From the models it can be established which areas require further erosion protection than proposed by the vegetation cover within the AXM Consulting report²².

It should be noted that SAGA was also used to highlight areas that do not conform to the proposed final landform requirements as detailed in Environmental Authority: MIN100329505 for Isaac Plains Coal Mine and the nonconforming landform details have been discussed in detail in Section 4.2.1 above.

²² "Reference Site Monitoring and Development of Draft Rehabilitation Completion Criteria for Isaac Plains Coal Mine", AXM Consulting, August 2010.

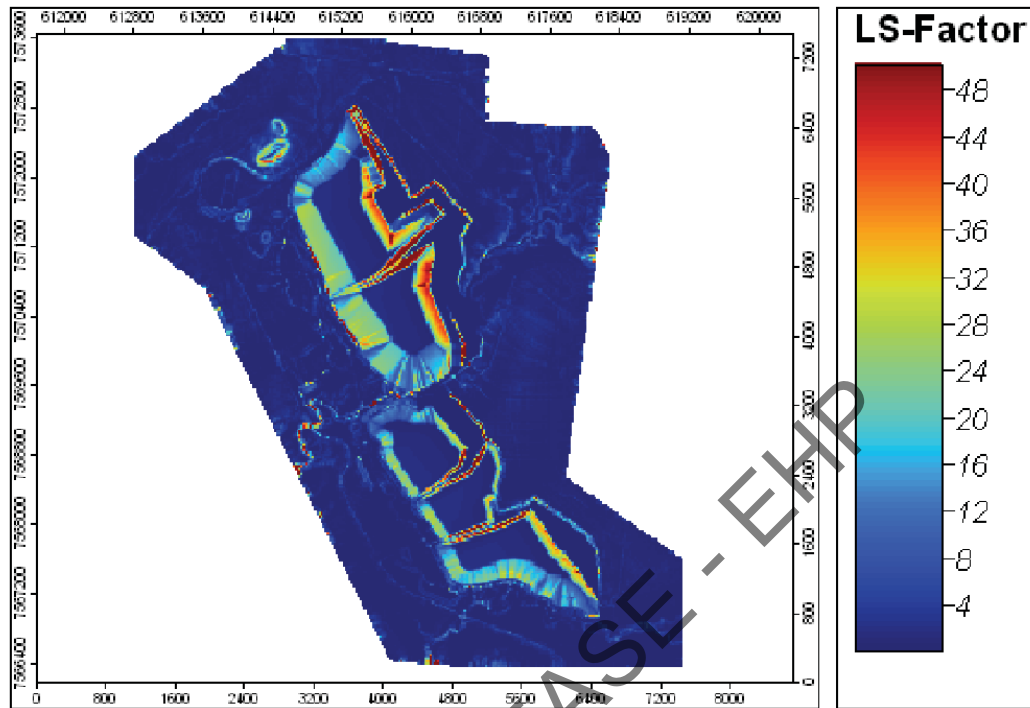


Figure 7. Length to slope (LS) factors generated by SAGA for the final landform

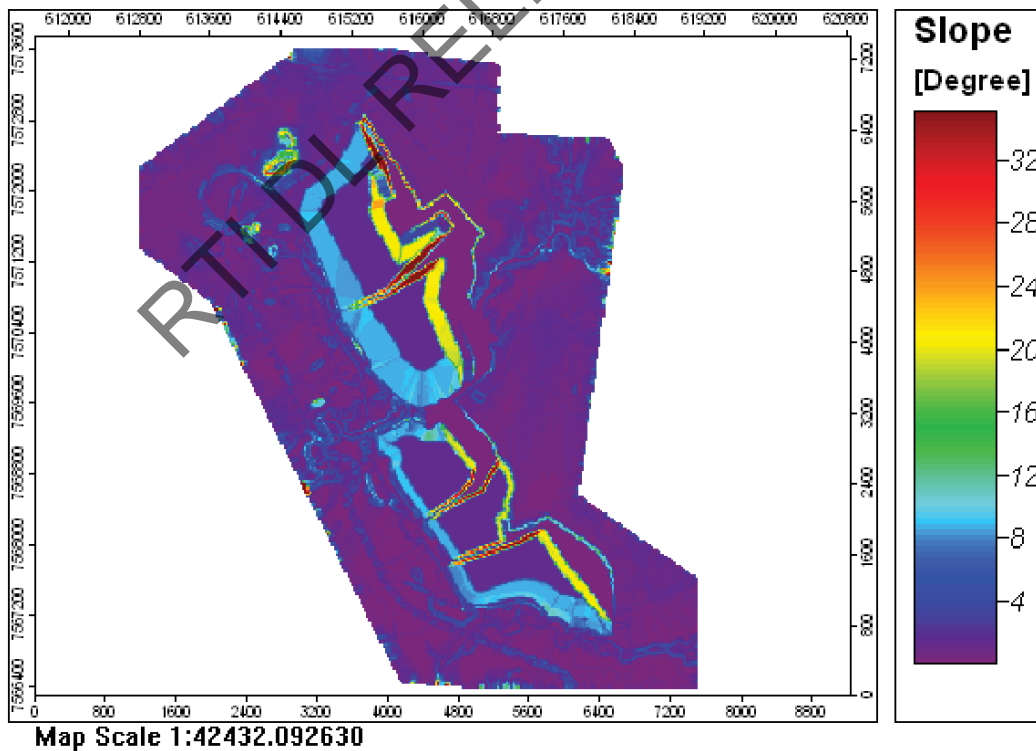


Figure 8. Proposed Final Landform Slopes

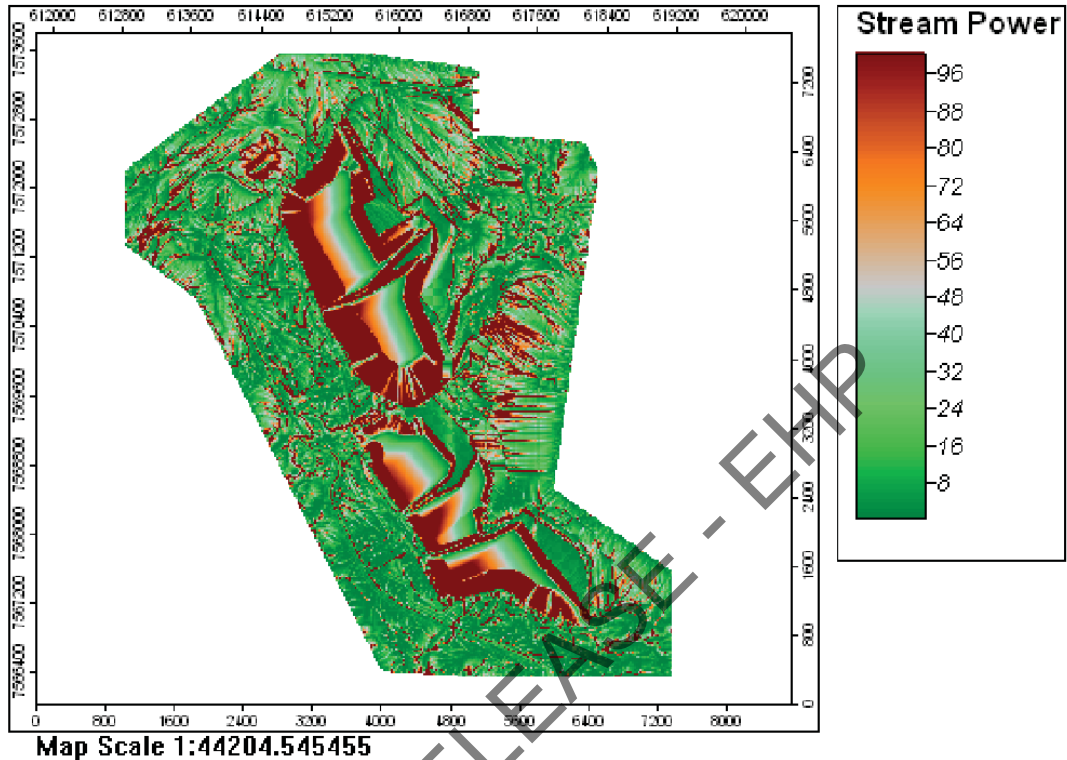


Figure 9. Areas of high water flow during significant rainfall events and flooding

From the models above it has been demonstrated that the areas of greatest concern are the highwalls, lowwalls and external dump walls. The actual rates of erosion generated from these slopes are discussed in Section 5.5 below.

Figure 9 also highlights that the waste rock landform between the northern and southern pits is blocking the natural drainage path, which forces a new drainage path to abut the proposed landform. This should be avoided where possible as it may lead to toe erosion and destabilisation of the external dump walls. It is recommended that in the future landform design revisions, the toe of all external dump walls be buffered by a safe distance to control sediment delivery and undercutting of final batter slopes.

5.4 Erosion Assessment Parameters

The parameters shown in Table 7 below were generated using the methods detailed in Section 4.1, the ground conditions anticipated onsite as detailed in Section 2.4 and the proposed vegetation cover as detailed in Section 5.2.

Table 7: Erosion Assessment Parameters

Area of the Mine	R value	K value	Average LS value	C value	P value	A values (t/hr/yr)
Highwall *	2500	0.015	89.9	1	1.3	4,382 **
Low wall *	2500	0.025	14.2	0.1	0.9	141.9
Remaining Mine Site	2500	0.047	2	0.07	0.9	14

* within final void

** unrealistically high – more likely value discussed below

It should be noted the A values for the highwall are likely to be less than those provided in Table 7 above, as the model used to generate these values are for soils, not rock faces.

As an example, Moon et al. (2005)²³ estimated the profile retreat along a high-relief natural rock slope adjacent Lawrence Hargreave Drive near Stanwell Park, New South Wales. Results from this study showed profile retreat to be in the order of 1m to 2m per century for a truly "long-term" landform, and a local rate of 1m to 5m per century for specific cliff-forming blocky sandstone units. The high-relief natural rock slope studied by Moon et al. is an example of a high-relief natural rock slope formed in sedimentary rocks very similar to those of the Bowen Basin. As such, in the absence of local data and / or data for excavated rock slopes in the Bowen Basin, a general rock face retreat rate of 1m to 5m per century may be useful starting-point for considering long-term performance.

Given this, it is estimated that the estimated maximum highwall erosion rate is likely to be in the order 50t/hr/yr which is almost a tenth of that estimated by the model using soil.

5.5 Erosion Assessment Results

The total erosion rates were assessed on the basis of final void (including highwall, low wall and void floor) and the remaining mine land use area. These two groups were chosen because the rehabilitation landform criteria, and therefore the erosion control measures, are significantly different between the two groups. To reiterate points made in Section 5.1 the final void is to be graded to final landform and remain untopsoiled and unseeded because its proposed long term usage is to be a water body. In contrast the remaining mine lease area is to be topsoiled and seeded and possibly hydro-mulched and rock mulched, as mining ceases in each area or on completion of all mine works.

²³ Moon A.T., Wilson R.A. & Flentje P. (2005). "Developing and using landslide process rates and size frequency models".

The site catchment erosion rates were estimated to be as follows:

Table 8: Estimated Erosion Rates

Area of the Mine	Area (ha)	Estimated Erosion Rate (A value) (t/ha/yr) **	Total Area Erosion Rate (t/yr)
Final Void *	123	139 **	17,097
Remaining mine area	512.14	14 ***	7,170
Totals		38.2 ****	24,267

* including highwall, low wall and void floor

** average values using the figures suggested in Section 5.2 above

*** from Table 7 above

**** average across the entire site

Outside of the final void area the estimated erosion rates are equivalent to those anticipated in the surrounding environment. However, with reference to Section 5.1, the total estimated erosion rate across the site is almost twice that expected from comparable unmined land in the same locality. As stated previously (Section 5.1), the final landform design does not wholly have context in the natural surrounding landscape and as such some additional erosion as a result of the high and low walls could be expected. As such, it is anticipated that the long term sediment erosion control goal will be to control erosion rates outside of the final voids to a rate not exceeding those on comparable unmined land in the same locality and to contain the higher erosion rates to within the final voids, using the water storage area as an erosion sediment trap, negating the impact of high erosion rates on the surrounding environment.

Where the sediment control management strategy of the final highwall and lowwall is to manage accelerated erosion of unnaturally steep slopes by containing it within the final void (as suggested above) accelerated erosion rates could be expected for some time (20 to 50 years), until a resistant gravel lag forms.

6. Geotechnical Assessment

The proposed final landform including the final void has been designed as the first stage of design for mine closure. Echelon Mining Services supplied the mine closure design for geotechnical long-term stability assessment. Using information gathered from Isaac Plains Coal Mine consultants, the geology, geotechnical nature and conclusions from the pre-mining environment have been used to assess the stability of the final void.

Technical Guideline 24: Open Pit Rehabilitation and Technical Guideline 27: Geotechnical Slope Stability provide a framework for assessment of mine closure final landform. No landform is stable over geological time and with the assessment of a final landform, assumptions have to be made as to the potential environment of a permanent slope in regards to conventionally used factors of safety. Studies may be required for the long-term groundwater levels which will be one of the strongest influencing factors of the stability of the lowwall at Isaac Plains Coal Mine. Whilst a slope may be analysed as permanently stable (i.e. unlikely catastrophic failure), erosion and weathering will have an impact of the slope and over time can influence the strength of the geological sedimentary units and reduce the strength of structure within the pit slopes. In these cases it is possible for localised failures to occur if a slope is not conducive to revegetation which will minimise erosion.

6.1 Geotechnical Assessment Parameters

As suggested in Technical Guideline 27: Geotechnical Slope Stability information on the conditions of the slope need to be collected, assessed and the most appropriate values used to assess the stability of the proposed final void. Galena, a limit equilibrium geotechnical stability program, was used to assess the Isaac Plains Coal Mine final void. Permanent slopes indicated by a Factor of Safety of greater than 1.5 have been applied to determining the likelihood of long term stability. The three final voids N1/N2, S2 and S3 as supplied by Echelon Mining Services for Isaac Plains Coal Mine were assessed by cutting one to two sections through the void and analysing the highwall and lowwall slopes. Only intact rockmass has been included in the assessment of the final void as structure will influence the stability of the pitwalls in localised areas. With the completed final void design, overlying structure with the void can determine areas that because of geologic structures, may require additional battering to reduce the instability of the wall.

The geological horizons have been defined from the work completed by JB Mining Services Pty Ltd and Insite Geology Pty Ltd geotechnical services. Material properties of the final void have been defined by work completed by Insite Geology Pty Ltd who completed the pre-mining geotechnical studies at Isaac Plains Coal Mine in addition to quarterly inspections of the operations. Material properties used in the assessment of the final void are included Table 9.

Table 9: Material Properties

Material	Unit Weight kn/m^3	Cohesion kPa	Friction Angle $^\circ$
Unconsolidated Sediments	18	50	28
Weathered Permian	22	75	30
Unsaturated Permian	24	450	42
Saturated Permian	24	50	35
Leichhardt Coal Seam	14	30	35
Intact Floor (Saturated Permian)	24	50	35
Lowwall Spoil Unsaturated	18	50	30
Lowwall Spoil Saturated	20	20	25

The groundwater levels post mining will be the greatest influence on the stability of the lowwalls and can reduce the strength of the highwalls. A groundwater study on post-mining recovery should be defined once the final void for mine closure has been finalised. Groundwater pre-mining levels (based on Isaac Plains Coal Project Report of Assessment of Geotechnical Conditions, Insite Geology Pty Ltd) was 20m to 35m. For the stability analysis of the final void a groundwater level of 35m was assumed. It is expected that post-mining, the groundwater will not return to original levels surrounding the pit and hence the groundwater assumption is on the conservative side. For geology horizons below the water table, material properties mirror the values from the pre-mining geotechnical investigations before groundwater draw-down commenced. It has been assumed that a phreatic water surface exists across the highwall and lowwall and fills the final void 35m from natural surface. A piezometric surface has also been assumed to exist through the Leichhardt coal seam which is defined as a semi-confined to confined aquifer²⁴.

The pit floor below the lowwall is assumed to be stable and all shears or weak clay bands have been disrupted and of no influence on the lowwall stability. As this is a geotechnical practice for operational mining, where required, it is assumed that the final floor below the lowwall will be correctly disturbed to increase the friction plane and increase lowwall stability. Cross sections that have been cut through the three final voids have indicated a floor dip of 2° to 6° towards the east. Cross sections through the final void have been cut taking into consideration the coal seam dip, base of weathering and natural topography from design files supplied by JB Mining Services Pty Ltd.

It has been assumed that the co-disposal cells for the tailing and rejects have been correctly capped and are placed within the spoil dump so as not to influence the stability of the final lowwalls. With mine closure of Isaac Plains Coal Mine and the completed final void design, the location of the tailings cells should be surveyed and recorded to ensure no influence on the final lowwall.

²⁴ "Isaac Plains Coal Management Pty Ltd, Initial Advice Statement, Integrated Isaac Plains Project", Matrix+ Consulting Pty Limited, September 2006.

6.2 Geotechnical Assessment Results

6.2.1 Final Void

Cross sections were cut through each final void Pits N1/N2, S2 and S3. For each section the highwall and lowwall profile was analysed for stability of the rockmass. As mentioned previously no pit walls were analysed for structurally induced failures as remediation of these localised areas will require specific study. Attached Figure 10 shows the pit voids modelled with the analysed cross sections. Each wall profile has been analysed in Galena with the plotted results attached in Appendix B and the results tabulated in Table 10 to Table 12.

Table 10: Factor of Safety for a Highwall Profile through Pits N1 and N2

	Factor of Safety			
	Non-Circular Failure		Circular Failure	
	Highwall 45°		Highwall 45°	
Analysis Method	Sarma Multiple	Spencer Wright Multiple	Bishop Simplified Multiple	Spencer Wright Multiple
Pit N2	2.51	2.61	2.33	2.28
Pit N1	2.38	2.30	2.17	2.15

Results indicate that the highwalls, with no influencing structure have a FOS greater than 1.5. Endwalls have the same profile as the highwalls and hence a greater than 1.5 FOS, however a long term slope can be influenced by erosion, weathering and dispersion and within an endwall the cross dipping along the bedding can erode and become unstable in a shorter time frame than highwalls.

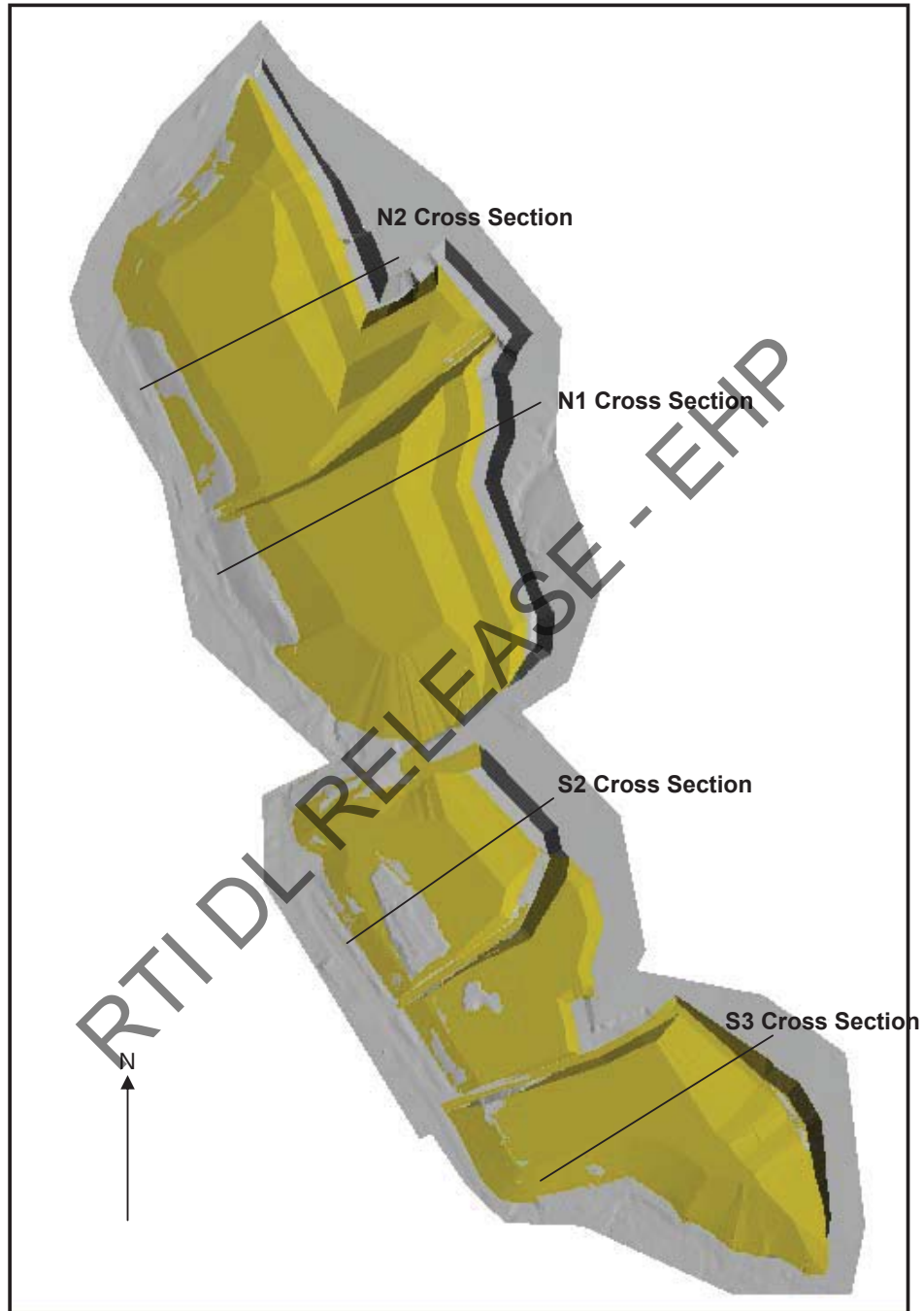


Figure 10: Final Landform Pits and Dumps with Geotechnical Cross Sections²⁵

²⁵ Plan adapted from "Isaac Plains North (Interim) Final Landform Analysis", Echelon Mining Services, October 2010.

Table 11: Factor of Safety for a Lowwall Profile through Pits N1 and N2

	Factor of Safety		
Analysis Method	Lowwall - Bishop Simplified Multiple		
Dragline Batter Slope	36°	25°-26°	15°-16°
Pit N2	1.08	1.47	2.28
Pit N1	1.06	1.40	2.20

Table 12: Factor of Safety for a Highwall and Lowwall Profile through Pits S2 and S3

	Factor of Safety	
Pit	Highwall 45° – Sarma Multiple	Lowwall 20° – Bishop Simplified Multiple
S2	2.35	1.69
S3	2.24	1.54

As stated in Technical Guideline 24: Open Pit Rehabilitation, as a general rule, slopes in weathered rock should not be left standing at slopes greater than 1 V: 1.5 H slope (30°). As the final void post-mining land use is a water storage area, the Environmental Authority Permit Conditions are for a competent rock wall at 45° (1 V: 1 H slope). Erosion and weathering will affect the weathered Permian horizon and this unit through the highwalls and endwalls should be flattened to reduce the potential instability of the weaker rock unit.

The proposed final lowwall in Pit N1/N2 comprises a 37° dragline spoil slope with a 100m bench and a then 20° truck shovel spoil slope. Assuming a recovered groundwater level of 35m from surface into the final void and saturating the lowwall, the FOS for a 36° slope (Environmental Authority Condition F4) is less than 1.5. Further analysis by reducing the dragline batter slope to 25°-26° and 15°-16° resulted in the attached Figure 11 and Figure 12.

The Galena analyses for the Pit N1 and N2 lowwalls, assuming a post-mining groundwater level 35m from surface, indicate that a dragline batter slope less than 25° will produce a FOS of greater than 1.5. With a defined post-mining groundwater study for the final void the FOS will be refined and it is likely that the dragline batter slope could be greater than 25° for water storage post-mining land use.

The results of the geotechnical analysis in Galena for the S2 and S3 highwall and lowwall profile is a greater than 1.5 FOS indicating a permanent slope. The weathering profile in the highwall and endwalls will continue to have the same issues mentioned above in the Pits N1/N2 and the weathered Permian horizon may require flattening to reduce the effect of erosion and weathering.

With Technical Guideline 33: Minesite Decommissioning mine closure of the final void should entail the long-term stability of the pit walls and control of erosion. Options for controlling erosion and stability include backfilling, regrading or benching. Accident prevention by effective bunding and/or fencing of the perimeter and the use of danger signs could be required at Isaac Plains Coal Mine with a proposed final void of 36° and 45° walls. As a part of the Environmental Management (EM) Plan for mine closure at Isaac Plains Coal Mine, each domain (i.e. final void) should include safety devices such as the mentioned exclusion of access to unstable areas through fencing and bund boundaries. Technical Guideline 24 states that if safety hazards remain at mine closure the EM plan must indicate what management controls will be implemented to reduce risk to humans or animals.

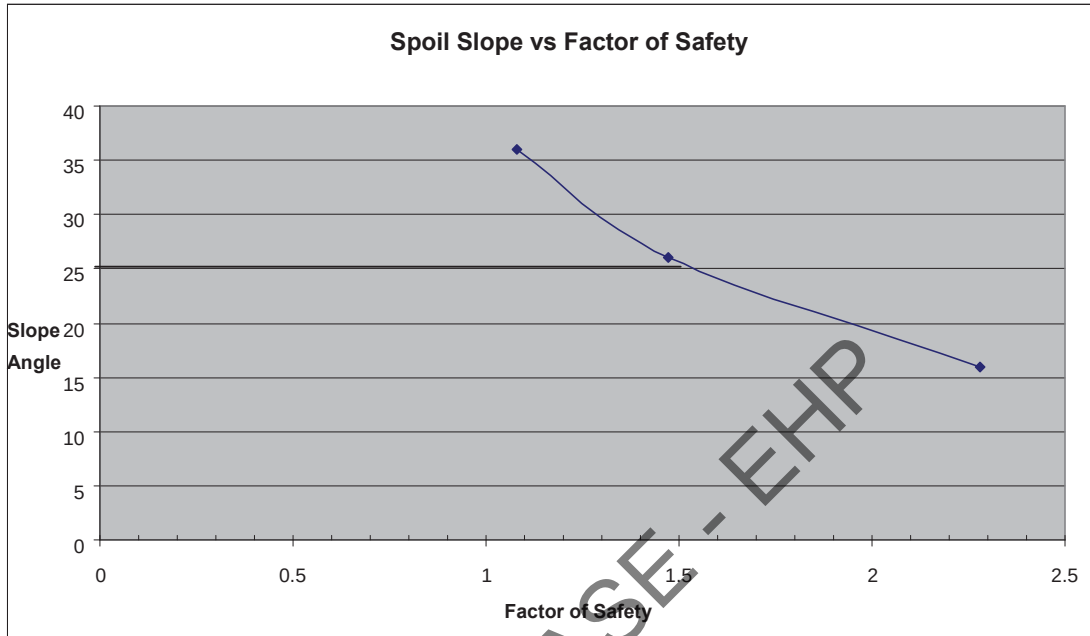


Figure 11: Pit N2 Lowwall Batter Slope.

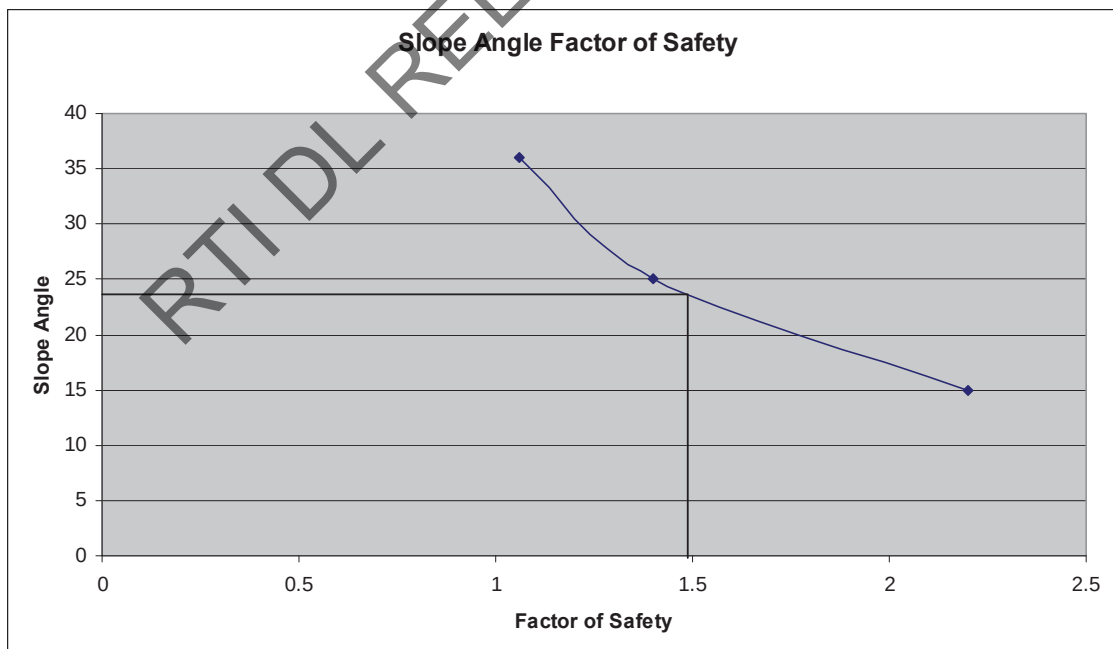


Figure 12: Pit N1 Lowwall Batter Slope.

6.2.2 Comparison of Final Void and Environmental Conditions

In the Pit N1/N2 the external dumps appear to meet the 8.5° criteria. The highwall of the final void also appears to meet the design criteria with a 45° wall, which should be a stable long-term batter slope in competent sandstones and siltstones. Instability may occur through the lowwall of the N1/N2 pit where the batter slope can meet the Environmental Authority Permit criteria of a 36° dragline spoil and 20° truck shovel dumps once adjusted from the 37° final landform design, refer to Figure 13. Where the lowwall begins to toe out towards the highwall in the centre of the pit the lowwall batter slope is greater than 36° (almost up to and possibly greater than 60°, refer to Figure 6) which is unlikely to remain stable in the long term. The lowwall stability can also be enhanced by battering the toe against the bottom of the highwall as suggested in Technical Guideline 24: Open Pit Rehabilitation.

Final landform Pit S2 has a final highwall batter angle of 45° which meets design criteria. The lowwall of the final pit void is 20° due to the S2 Pit being excavated by truck shovel which allows for greater flexibility for the final dump slope. The final landform design appears to backfill the southern area of the pit, and the eastern slope on the dump face has been designed at 20° with the southern dump slope at 37°, refer to Figure 14. As the dump face in the south backfills the final void and then rises above natural surface to toe out onto natural surface, it could be considered a waste rock dump external wall which should have an 8.5° batter. This dump could be considered geotechnical stable with a FOS of greater than 1.5 (due to material properties and no groundwater influence) however it is unlikely that revegetation would be successful at a 36°-37° slope and long term stability for a post end use of grazing may not be sustainable due to the amount of erosion and weathering of the slopes that could occur.

Final landform S3, Figure 15, has a ramp batter angle of 37° which as an incompetent rock slope and residual void should be 36°. The external dump walls are 8.5°, highwalls 45° and lowwalls that toe out into the pit are 20° in this truck and shovel excavated pit.

6.2.3 Influence of Structure

A plan of the location of the proposed final landform for Isaac Plains Coal Mine was overlaid with known structure supplied by JB Mining Services Pty Ltd. In Pits N1/N2 and S3 there is major structure that crosses through or close to the final highwall and endwalls. It is likely that wedge, planar and/or complex failures will occur depending on the orientation of the structure and dips into the pit. As it is likely that the proposed final void will change location towards mine closure, any structure through the final void will have to be considered in the pit wall slope to reduce the effect of erosion and weathering, reducing the stability of the wall. This could be addressed by battering back the slope of the pit walls to the angle of the failure plane reducing the weight of material above the structure.

6.2.4 In Pit Ramps

An in-pit ramp could be considered a Waste Rock Dump Lowwall as a part of the residual void. In-pit ramps in each pit would be a feature of a final void and as much backfill as possible should fill the ramps. The batter slopes on the ramp walls are designed at 37° but should be less than 36° according to the Environmental Authority Conditions. This may mean a slight change in operations in order to meet the final landform environmental conditions. Stability of these ramp walls should have a FOS

greater than 1.5 but it will depend on the post mining groundwater recovery level. If the groundwater does recover to near 35m from natural surface than the ramp batter slope may need to be less than 25° for long term stability.

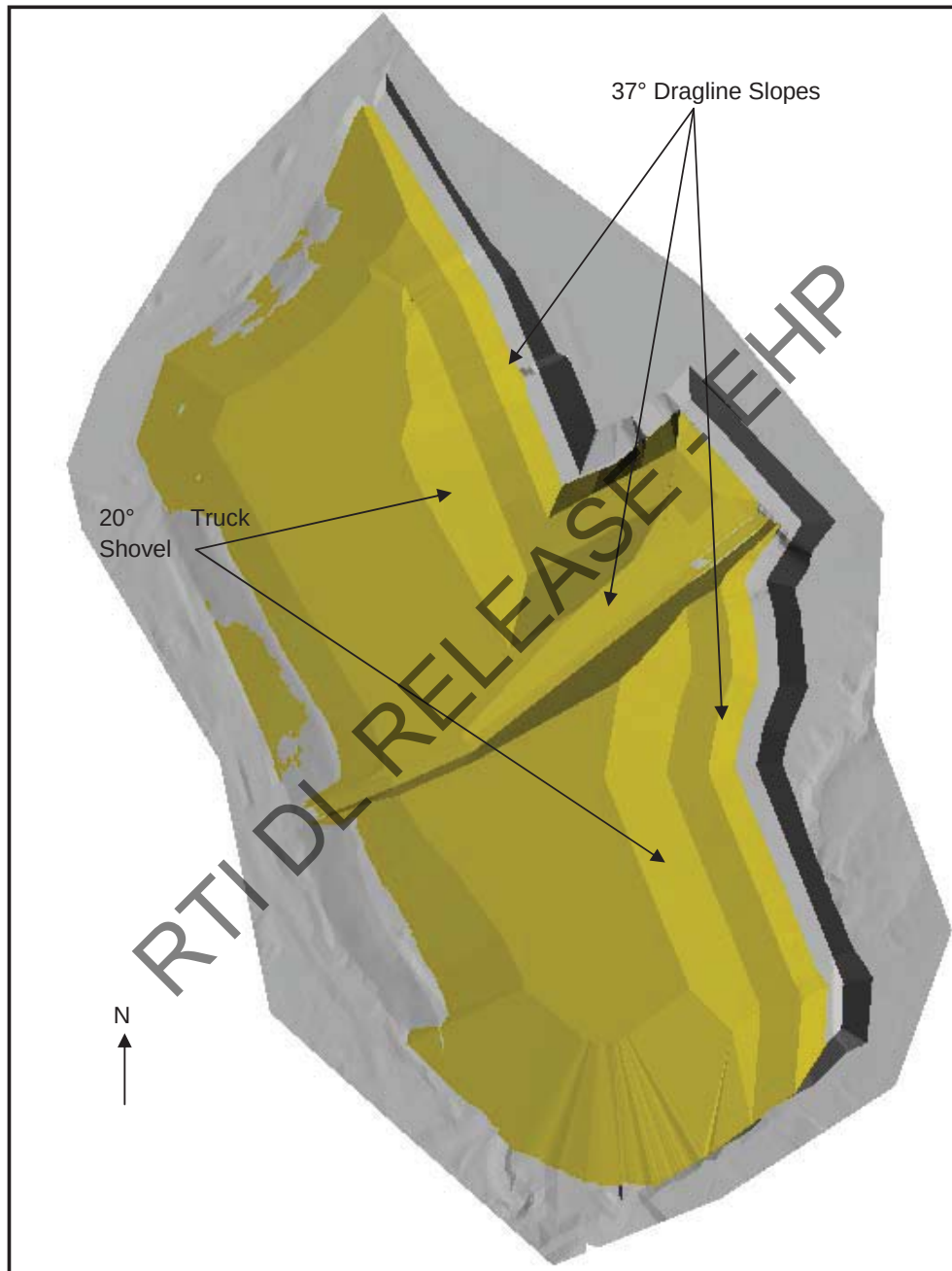


Figure 13: Pit N1/N2 Final Dump and Pit Landform²⁶

²⁶ Plan adapted from "Isaac Plains North (Interim) Final Landform Analysis", Echelon Mining Services, October 2010.

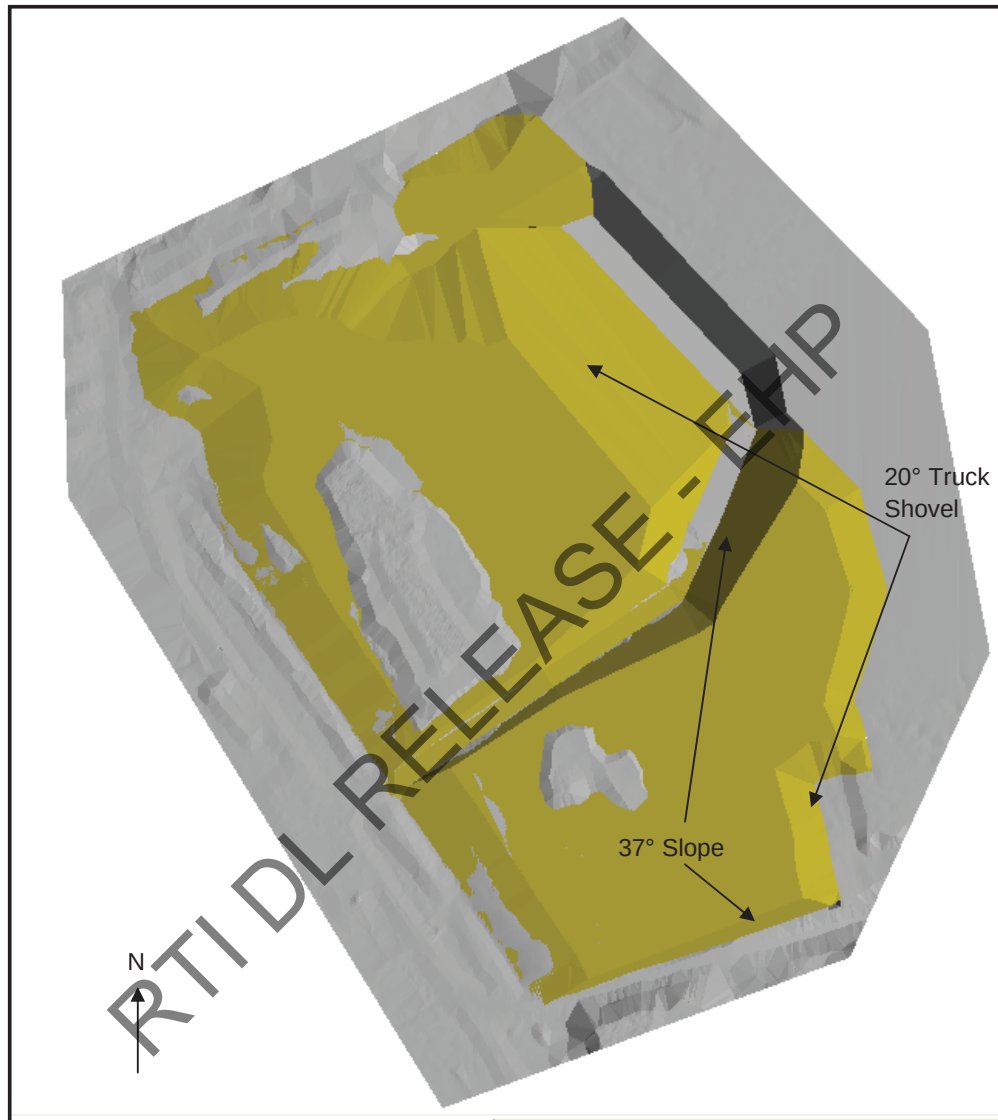


Figure 14: Pit S2 Final Dump and Pit Landform²⁷

²⁷ Plan adapted from "Isaac Plains North (Interim) Final Landform Analysis", Echelon Mining Services, October 2010.

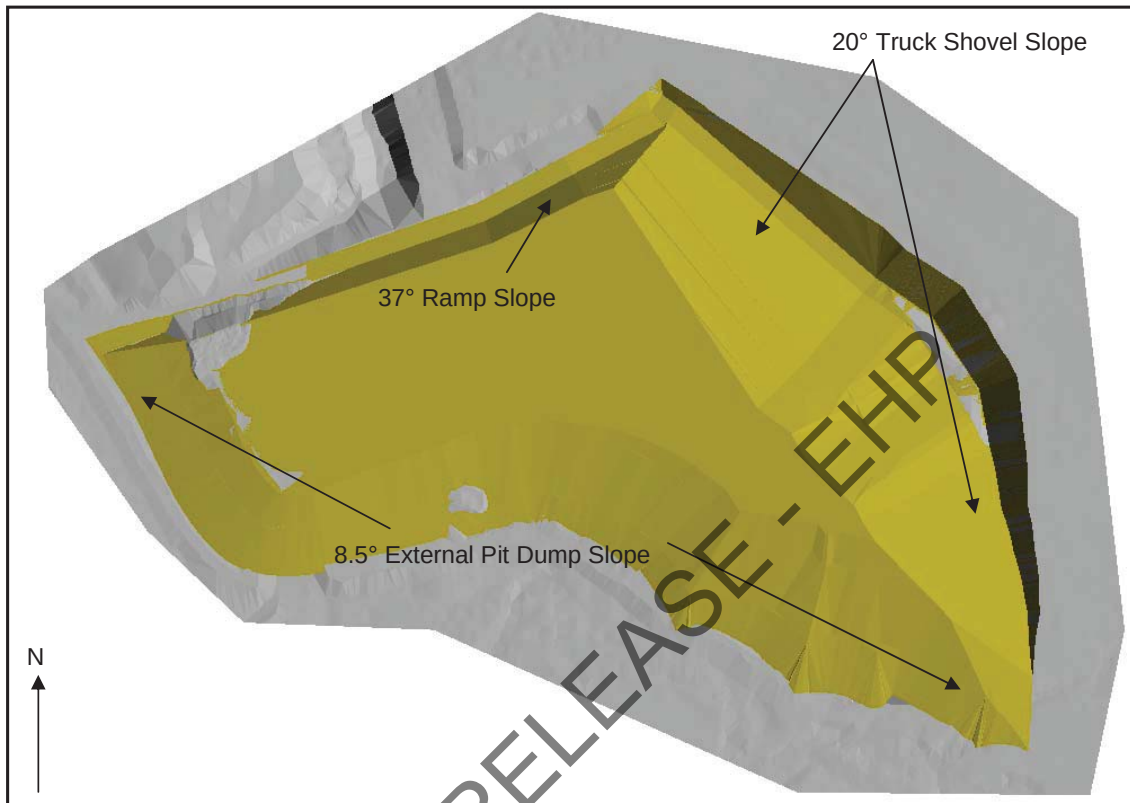


Figure 15: Pit S3 Final Dump and Pit Landform²⁸

²⁸ Plan adapted from "Isaac Plains North (Interim) Final Landform Analysis", Echelon Mining Services, October 2010.

7. Comments

Preparation of the mine closure plan will be an ongoing process for the entire mine life with reassessment every three years (Environmental Authority Permit Condition F11). It is likely that the final void will change and will be dependent on the economic environment, changes to technology and legislation, extension of mining leases and other factors into the next 10 to 20 years. The basic framework for the external dumps, rehabilitation and stability of a final void within the surrounding geological horizons can provide the basis for a mine closure and environmental management plan and begin the process of rehabilitation for completed dump slopes. Options to be considered for the final void are a reduction of the highwall and lowwall slopes, backfilling of the void or the fence and bunding perimeters around the final void which may need to be maintained in the long-term.

With minor adjustments to the currently proposed final void design, the final landform is expected to meet the required Environmental Authority Permit Conditions for stability. The adjustments will involve the flattening of external dump slopes at Pit S2 and adjustments to the centre lowwall at Pit N1. The long term stability of the dragline spoil lowwall in Ramp N1/N2 based on an indication of a permanent slope Factor of Safety (FOS) at 1.5, the 37° slope may have to be flattened to less than 25°. A groundwater study based on the post-mining recovery levels will refine the FOS which could result in a steeper long term stable slope.

With regards to erosion, the final landform design does not wholly have context in the natural surrounding landscape and as such some additional erosion as a result of the high and low walls that are to remain could be expected. Given this, it is proposed that the final landform long term sediment erosion control goal is to control erosion rates outside of the final voids to a rate not exceeding those on comparable unmined land in the same locality and to contain the higher erosion rates to within the final voids, using the water storage area as an erosion sediment trap negating further impact on the surrounding environment. The results of the modelling indicates that the current design essentially achieves the goal above, however, as stated in Section 5.2, erosion is prone to extremely high variation and as such, long term erosion modelling is required in order to truly establish.

This report is interim only, based on the current final landform design, and cannot be finalised until the nonconforming final landforms are finalised and revised to be within compliance criteria.

8. Limitations

DP has prepared this assessment for this project at Isaac Plains Coal Mine, Moranbah in accordance with DP's Proposal BNE100785 dated 10 November 2010 and acceptance received from John Holland Group Pty Ltd dated 11 November 2010. This report is provided for the exclusive use of John Holland Group Pty Ltd for this project only and for the purpose(s) described in the report. It should not be used for other projects or by a third party. In preparing this report, DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the subsurface conditions only and are only as accurate as the reports provided to DP by the client. Subsurface conditions can change abruptly due to variable geological processes and also as a result of anthropogenic influences. Such changes may have occurred after the submission of the reports issue to DP for review.

DP's advice is based upon the conditions encountered by third parties within the reports provided by the client. The accuracy of the advice provided by DP in this report may be limited by undetected variations in ground conditions between sampling locations.

This report must be read in conjunction with the notes entitled 'About This Report' in Appendix A and any other attached explanatory notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion given in this report.

Douglas Partners Pty Ltd

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Appendix A

About this Report

RTI DL RELEASE - EHP

About this Report

Douglas Partners



Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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Appendix B

Galena Geotechnical Diagrams

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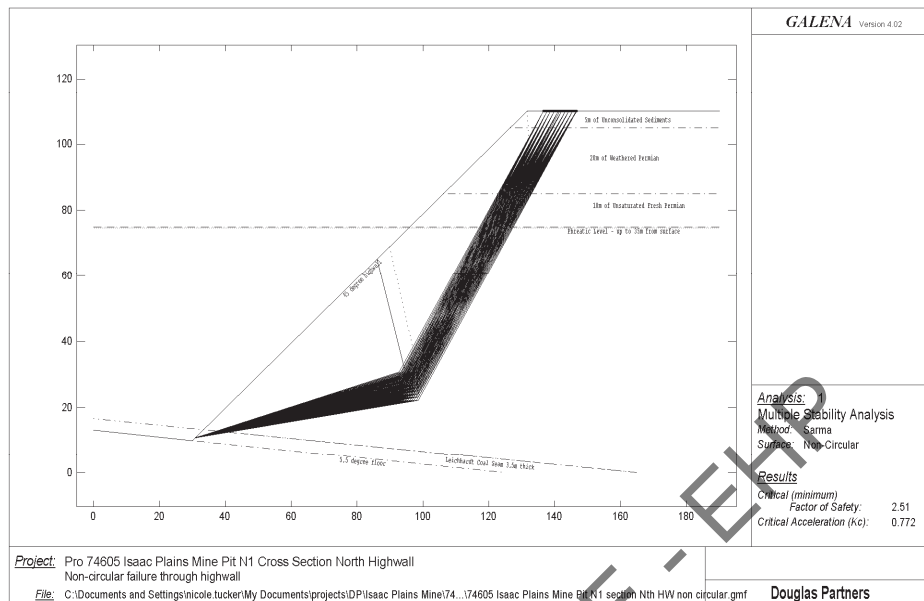


Diagram 1: Pit N2 Highwall – Non Circular Failure – Sarma Multiple

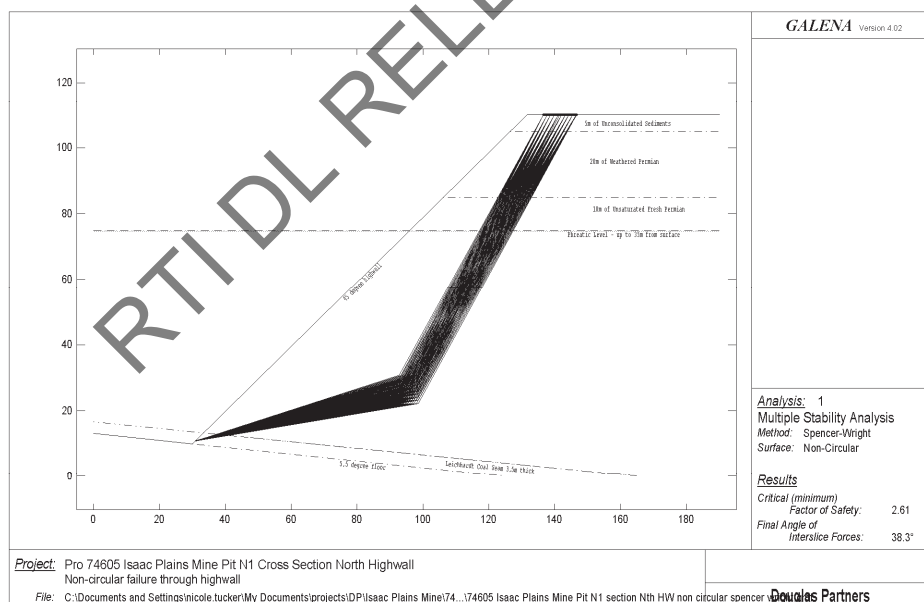


Diagram 2: Pit N2 Highwall – Non Circular Failure - Spencer Wright Multiple

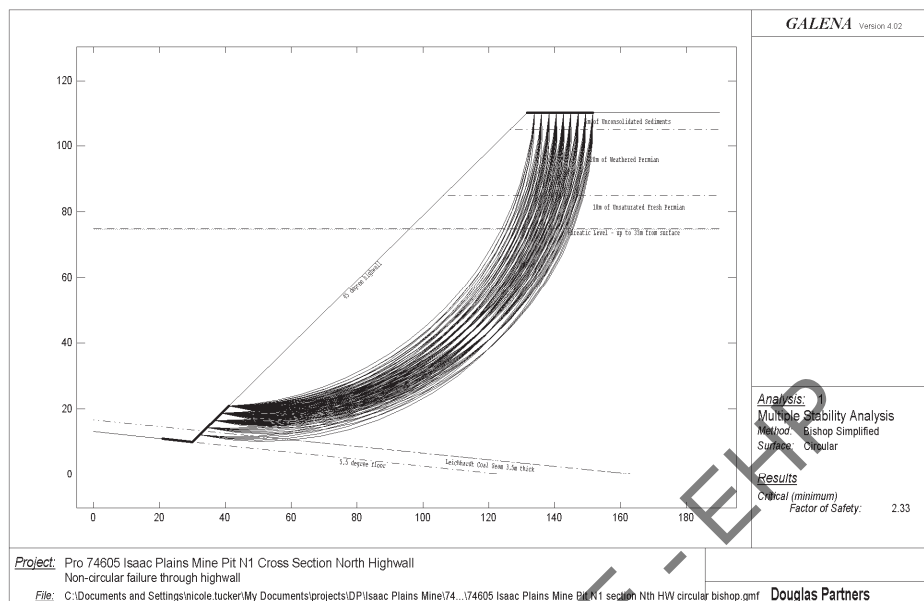


Diagram 3: Pit N2 Highwall – Circular Failure – Bishop Simplified Multiple

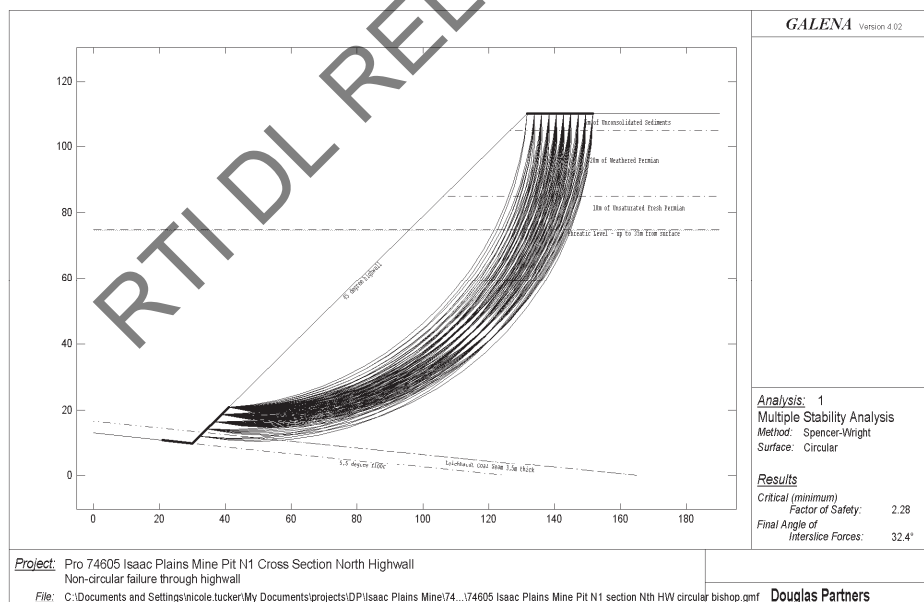


Diagram 4: Pit N2 Highwall – Circular Failure – Spencer Wright Multiple

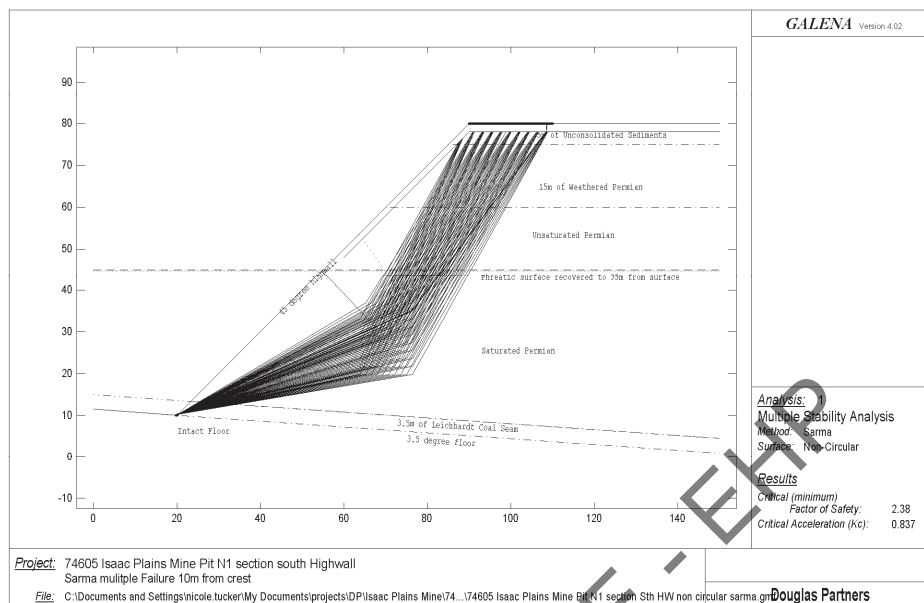


Diagram 5: Pit N1 Highwall – Non Circular Failure – Sarma Multiple

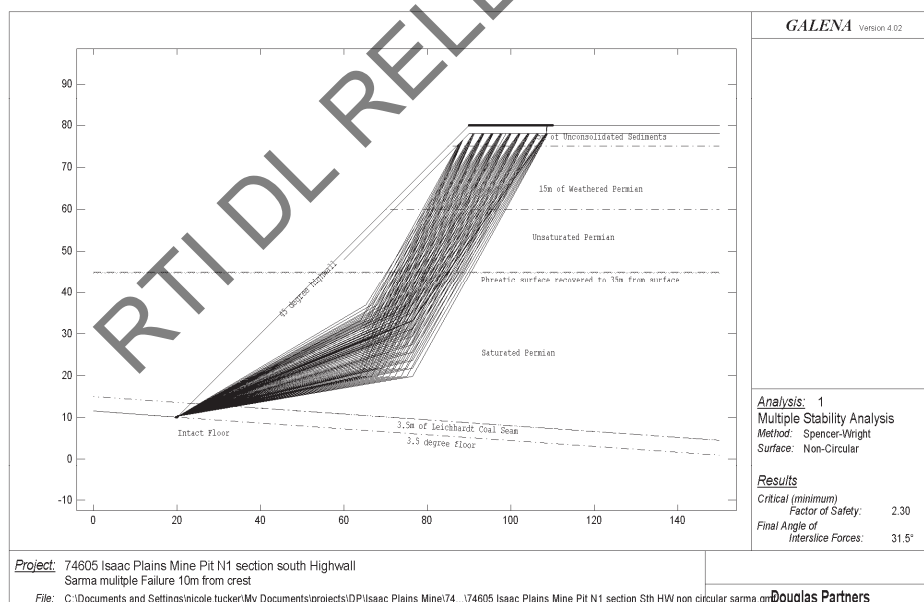


Diagram 6: Pit N1 Highwall – Non Circular Failure – Spencer Wright Multiple

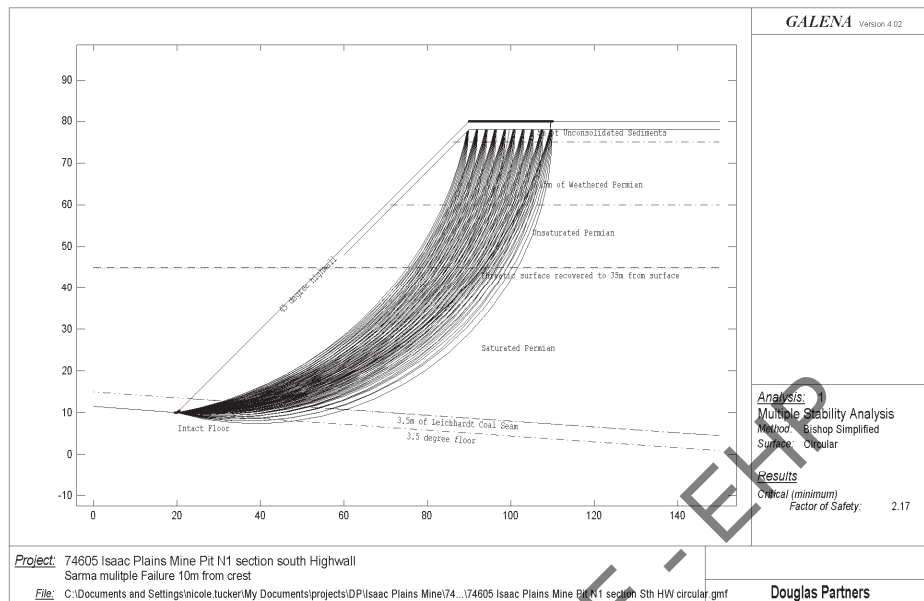


Diagram 7: Pit N1 Highwall – Circular Failure – Bishop Simplified Multiple

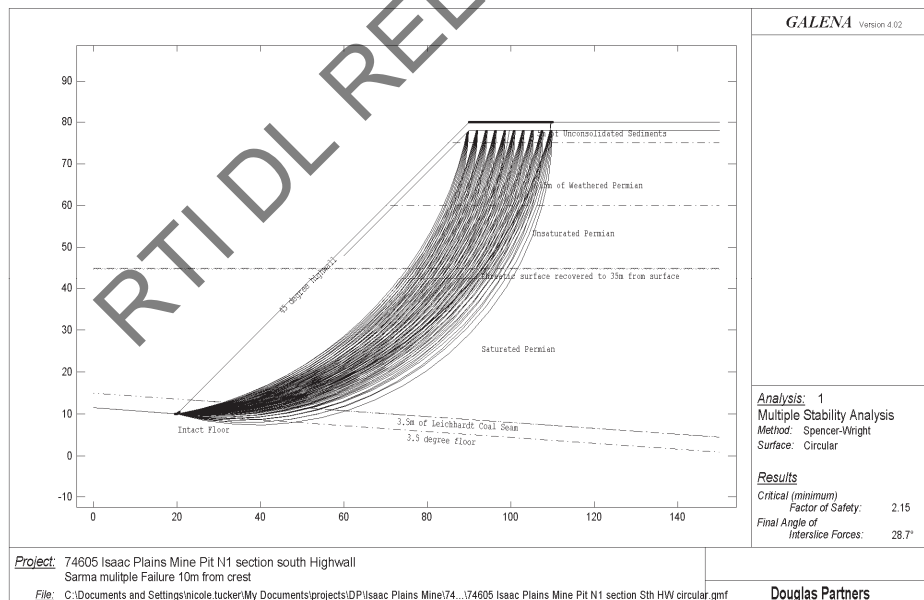


Diagram 8: Pit N1 Highwall – Circular Failure – Spencer Wright Multiple

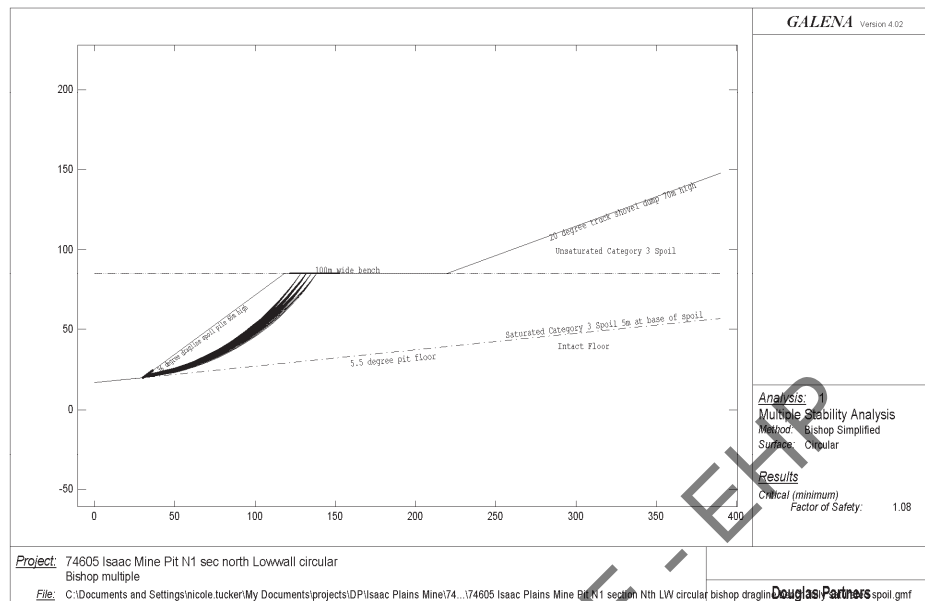


Diagram 9: Pit N2 Lowwall – Circular Failure 36° Slope

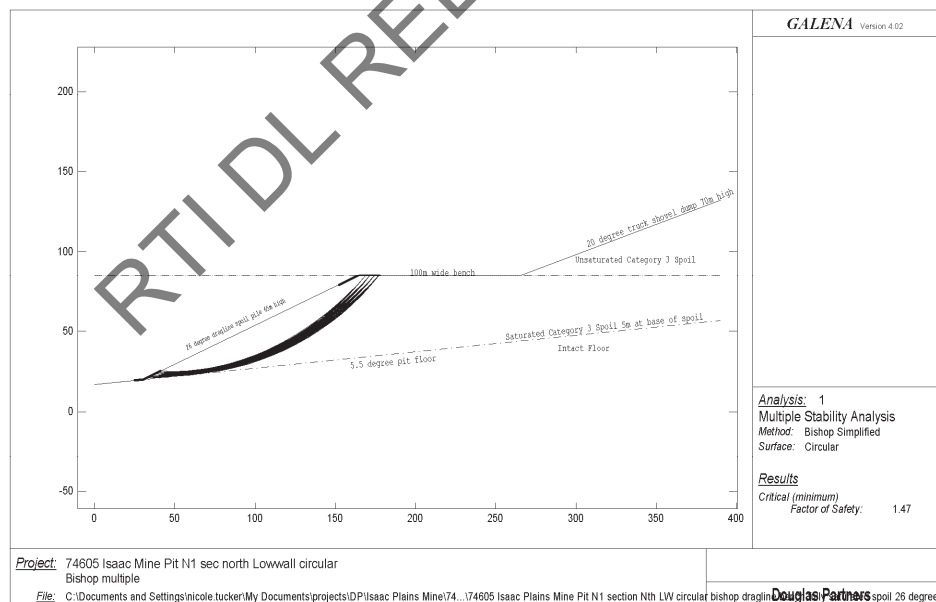


Diagram 10: Pit N2 Lowwall – Circular Failure 26° Slope

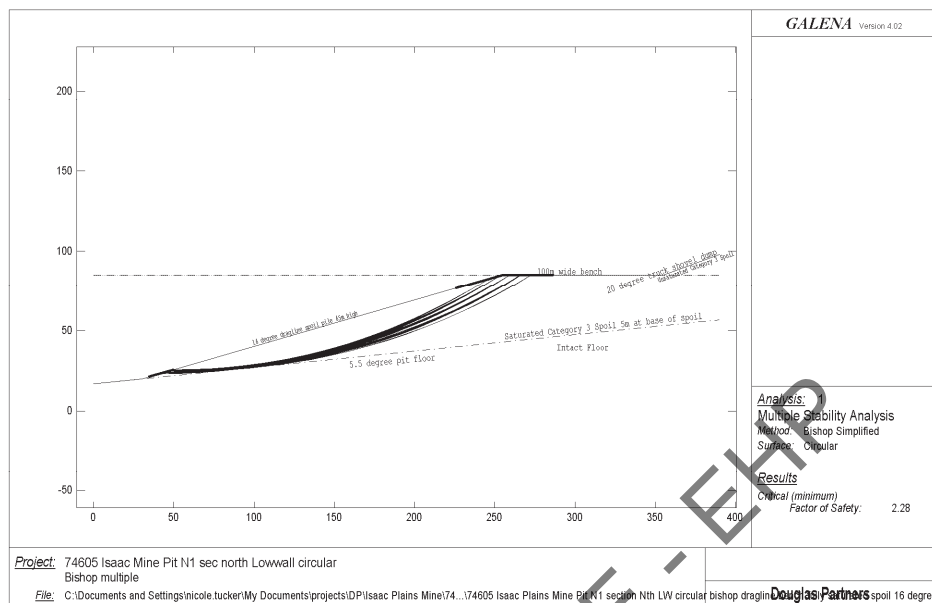


Diagram 11: Pit N2 Lowwall - Circular Failure 16° Slope

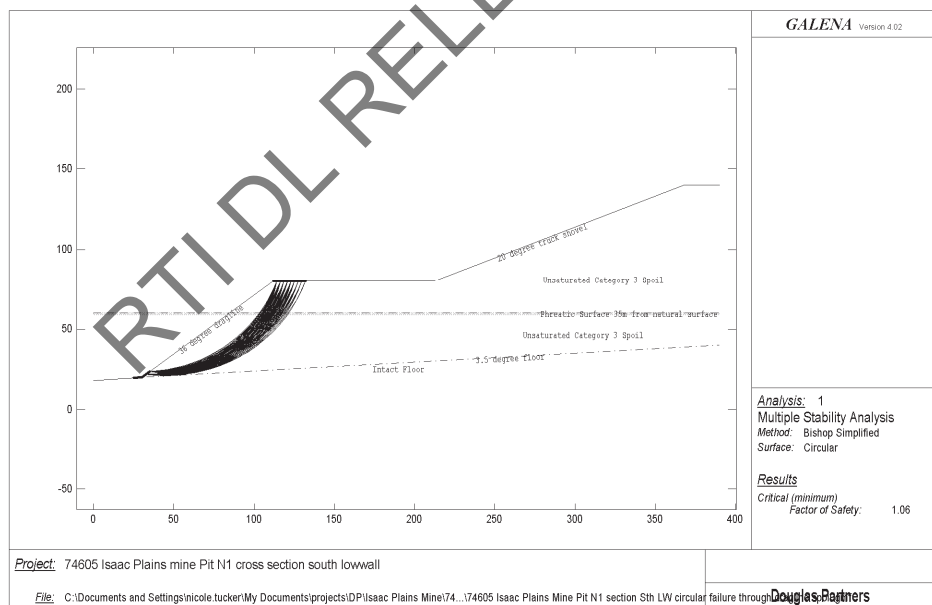


Diagram 12: Pit N1 Lowwall – Circular Failure 36° Slope

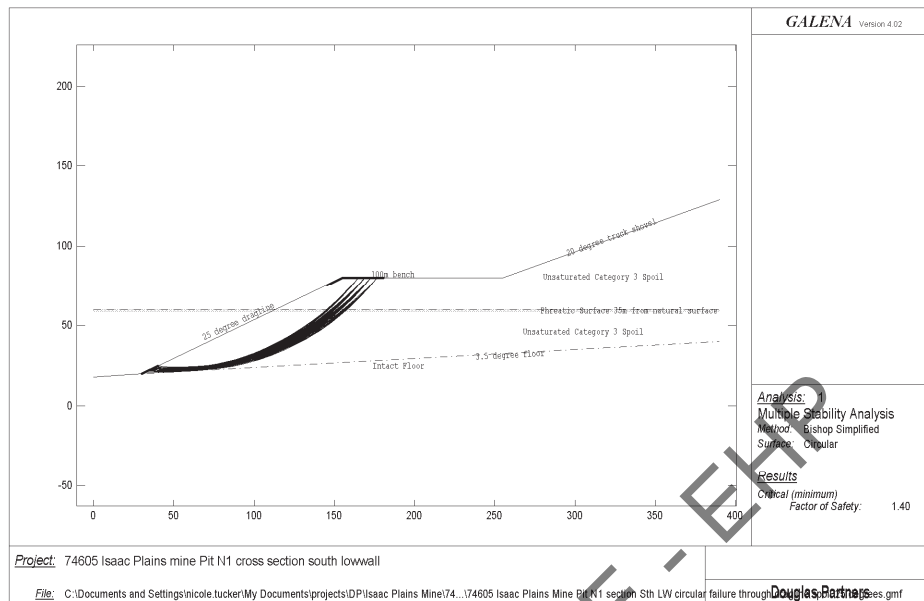


Diagram 13: Pit N1 Lowwall – Circular Failure 25° Slope

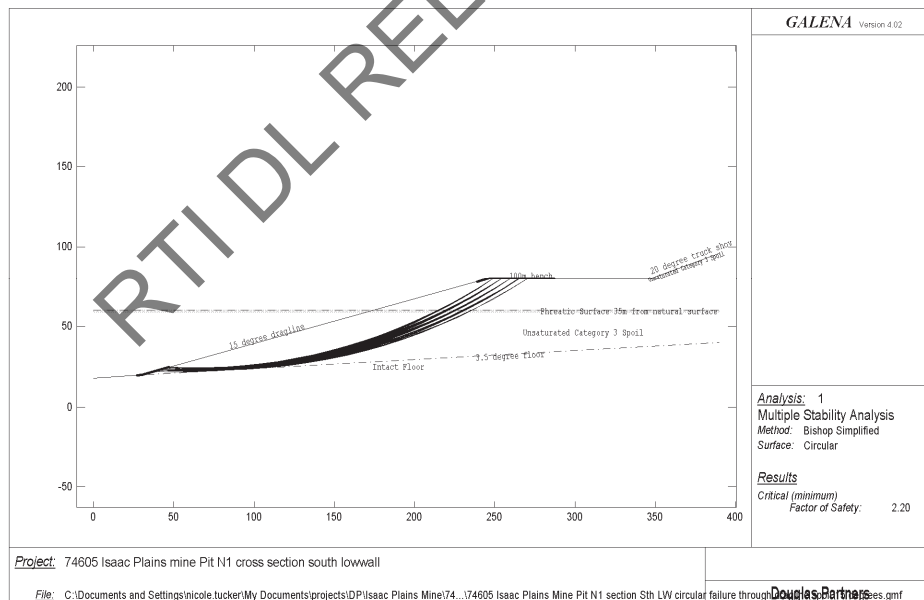


Diagram 14: Pit N1 Lowwall – Circular Failure 15° Slope

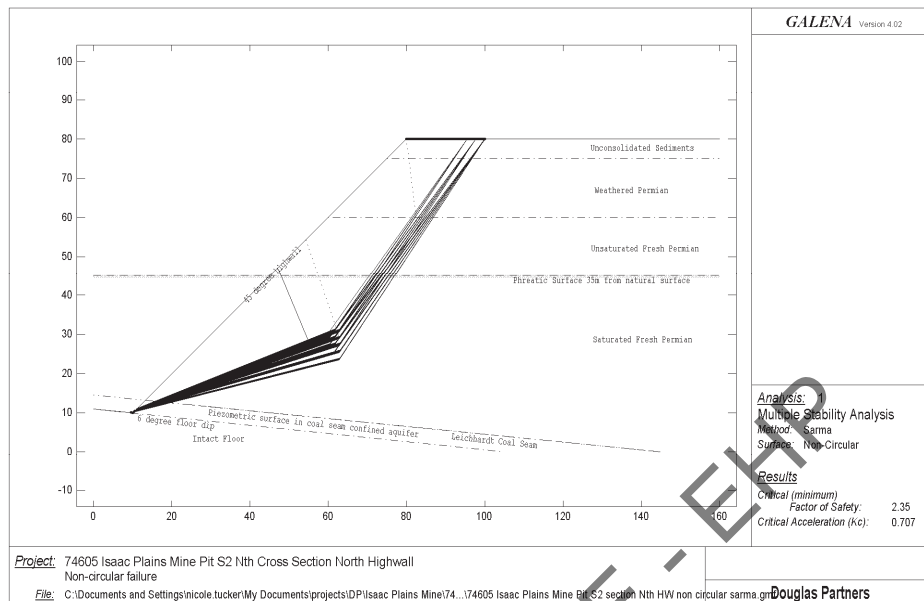


Diagram 15: Pit S2 Highwall – Non Circular – Sarma Multiple

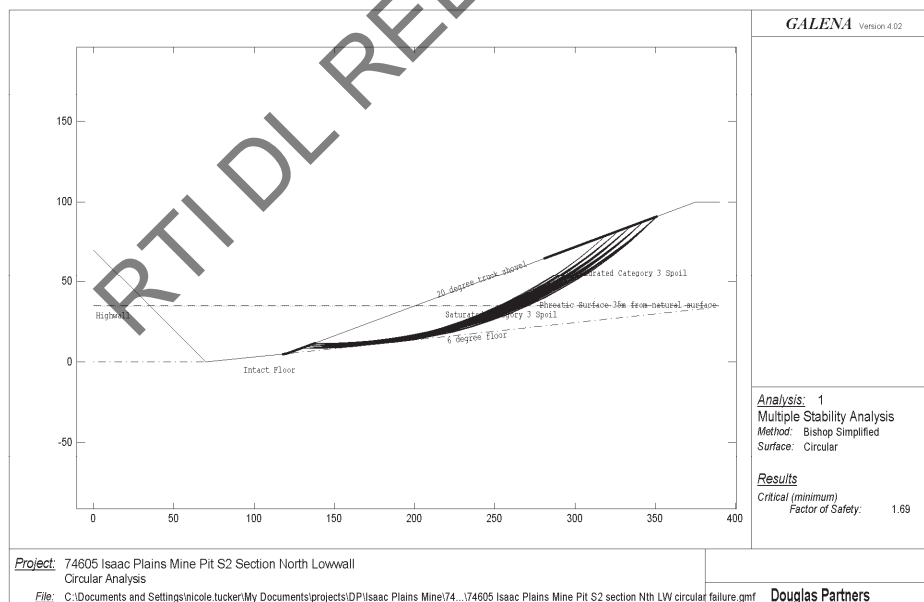


Diagram 16: Pit S2 Lowwall – Circular – Bishop Simplified Multiple

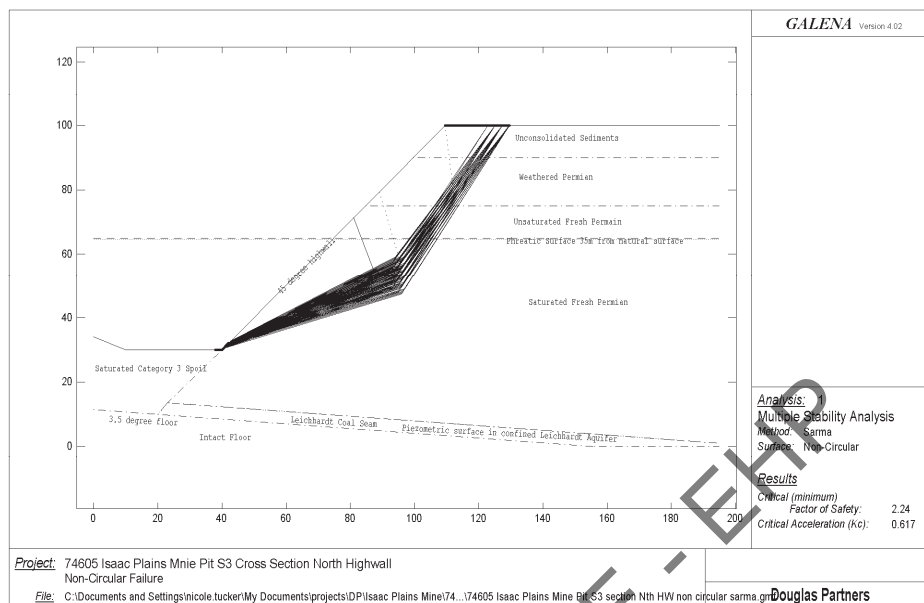


Diagram 17: Pit S3 Highwall – Non Circular Failure – Sarma Multiple

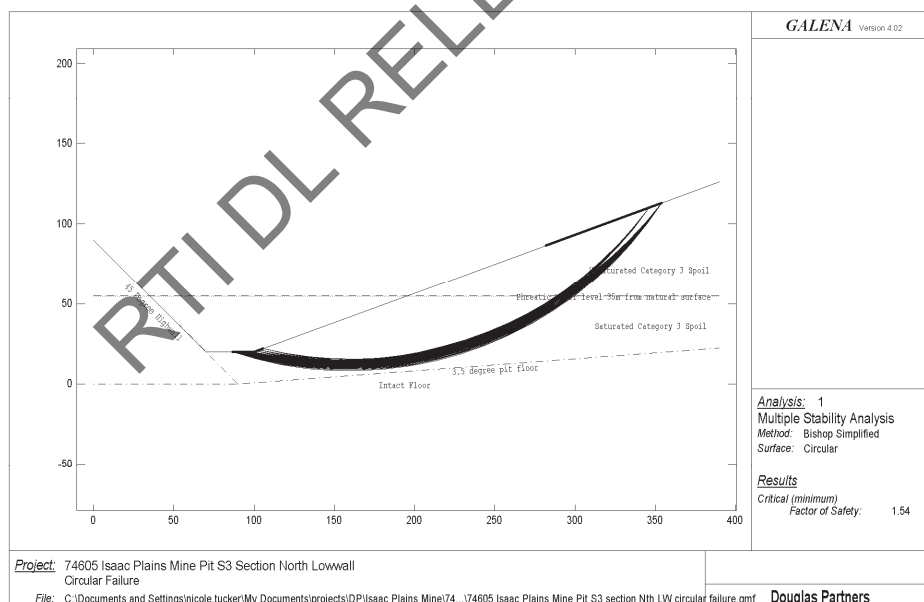


Diagram 18: Pit S3 Lowwall – Circular – Bishop Simplified Multiple

Environmental Protection Act

Transitional environmental program certificate of approval number MAN11259

This certificate of approval is issued by the administering authority pursuant to section 339 of the Environmental Protection Act 1994. A transitional environmental program is a specific program that, when approved, achieves compliance with the Environmental Protection Act 1994 for the matters dealt with by the program by reducing environmental harm, or detailing the transition to an environmental standard.

Under the provisions of the *Environmental Protection Act 1994*, this certificate of approval is hereby granted to:

Vale Australia (IP) Pty Ltd
Level 11, 100 Creek Street
GPO Box 731
Brisbane Qld 4001

C/c: Mr Cameron Farrington
Site Senior Executive
John Holland Group P/L
Isaac Plains Coal Mine
PO Box 181
Moranbah Qld 4744

approving the draft transitional environmental program, titled *Draft Transitional Environmental Program Under Section 333 of the Environmental Protection Act 1994* for management of pit dewatering at Isaac Plains Coal Mine, ML70342.

The draft transitional environmental program, dated 15 December 2010, was received by this office on 15 December 2010.

TEP MAN11259 is approved, subject to the following approval condition:

1. Departmental Review of TEP

The release of mine affected water under authority of this TEP may be reviewed at any time in accordance with Table 1: Trigger Values at Downstream Locations. The department may require the TEP holder to cease any release if values are met or exceeded at these locations.

Table 1: Trigger Values at Downstream Locations (Isaac River)

Quality characteristic	Trigger Value	Flow Trigger	Monitoring Point
Electrical conductivity (uS/cm)	525	<5m ³ /s	DERM Gauging Station 130410A (Deverill)
	400	>5m ³ /s	DERM Gauging Station 130410A (Deverill)
	400	All Flows	DERM Gauging Station 130401A (Yatton)

The transitional environmental program remains in force until 30 June 2011.

In any case where conditions are imposed upon a certificate of approval, you may apply to the administering authority for a review of the decision. You may also appeal against the decision to the Planning and Environment Court.

Information relating to a review of decisions or appeals under the *Environmental Protection Act 1994* is included with this notice. This information is intended as a guide only. You may have other legal rights and obligations.

Should you have any queries in relation to this Notice, Glen Wright of the Department of Environment and Resource Management on telephone 4980 6200 would be happy to assist you.

sch4p3(3) Prejudice the protection of an individuals right to privacy

Signature

18/12/2010.

Date

Christopher Loveday
Manager (Environmental Services - Mining)
Department of Environment and Resource Management

Enquiries:
Department of Environment and Resource Management
PO Box 19
EMERALD QLD 4720
Phone: 4980 6200
Fax: 4982 2568

Notice

Environmental Protection Act

Decision to grant an approval for a draft transitional environmental program

This statutory notice is issued by the administering authority pursuant to section 340 of the Environmental Protection Act 1994, to advise you of a decision or action.

Your reference : EA MIN100329505:ML70432

Our reference : MAN11259; EMD2214

Vale Australia (IP) Pty Ltd
Level 11, 100 Creek Street
GPO Box 731
Brisbane Qld 4001

C/c: Mr Cameron Farrington
Site Senior Executive
John Holland Group P/L
Isaac Plains Coal Mine
PO Box 181
Moranbah Qld 4744

Attention: Mr Cameron Farrington

Re: Application for an approval for a transitional environmental program for pit dewatering and water management at Isaac Plains Coal Mine, tenures ML70342.

Thank you for your application for an approval for a transitional environmental program. (MAN 11259)

Your application, which was received by this office on 15 December 2010, has been approved.

A copy of the certificate of approval is attached.

Fees apply for the assessment of a draft transitional environmental program and any subsequent annual returns. The fees are outlined in the attached operational policy *Transitional Environmental Program (TEP) fees*.

A fee of \$3077.40 is payable.

Should you have any queries in relation to this notice, Glen Wright of the Department of Environment and Resource Management on telephone 4980 6200 would be happy to assist you.

sch4p3(3) Prejudice the protection of an individuals right to privacy

SIGNATURE

Christopher Loveday
Manager (Environmental Services – Mining)
Delegate of the administering authority
Environmental Protection Act 1994

18/12/2010.

DATE

Enquiries:

Department of Environment and Resource Management
PO Box 19
EMERALD QLD 4720
Phone: 4980 6200
Fax: 4982 2568





Assessment Report under the
Environmental Protection Act 1994
on the
Environmental Impact Statement
for the
Integrated Isaac Plains Project
proposed by
IP Coal Pty Ltd and Vale Australia (IP) Pty Ltd
managed by
Isaac Plains Coal Management Pty Ltd

March 2009

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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 Integrated Isaac Plains Project (IIPP) proposed by the IP Coal Pty Ltd and Vale Australia (IP) Pty Ltd Joint Venture. The Department of Environment and Resource Management (DERM), 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.

The objective of this assessment report is to:

- assess the adequacy of the EIS in addressing the final terms of reference (TOR), and the adequacy of the draft environmental management plan (EM plan);
- summarise key issues associated with the potential adverse and beneficial environmental, economic and social impacts of the Integrated Isaac Plains Project and the management, monitoring, planning and other measures proposed to minimise any adverse environmental impacts of the project; and
- make recommendations on the suitability of the project to proceed and where so, to make recommendations on necessary conditions for any approval required for the project.

Section 58 of the EP Act lists the criteria that the DERM must consider when preparing an EIS assessment report, while section 59 of the Act states what the content must be. The IIPP is not a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Consequently, matters prescribed in Part 1A of the Queensland *Environmental Protection Regulation 1998* (EP Reg) do not apply to this EIS assessment report for the project.

In summary, this assessment report addresses the adequacy of the EIS in addressing the final terms of reference (TOR), the suitability of the draft environmental management plan (EM plan) and other prescribed matters.

This report provides a summary and assessment of the key issues identified through the EIS process, and discusses in greater detail those issues of particular concern that were either not resolved or required specific conditions for the project to proceed.

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

1.1 Project details

The IP Coal Pty Ltd and Vale Australia (IP) Pty Ltd unincorporated joint venture partners are the proponents for the extension of the existing Isaac Plains coal mine into the expansion area, known as the Integrated Isaac Plains Project (IIPP). Isaac Plains Coal Management Pty Ltd (IPCM) will act on behalf of the proponents as the management company responsible for all operations undertaken as part of the IIPP. The EIS assessed in this report was required for amendment of the existing environmental authority (number MIN100329505) to allow the proposed mining activities. The triggers for the project EIS of particular relevance for this EIS assessment report was mining more than 2 million tonnes a year (Mt/y) of run-of-mine (ROM) coal and clearing endangered regional ecosystems classified as Category B Environmentally Sensitive Areas.

The proposed expansion area would be located approximately 12km south-east of the township of Moranbah and 127km west-southwest of the city of Mackay, within Isaac Regional Council (Formerly Belyando Shire Council), in the Bowen Basin, central Queensland. The main infrastructure and mining pits for the IIPP would be located on Mining Lease Applications (MLA) 70361 and MLA70381. The proposed access/haul road linking the expansion area to the existing Isaac Plains coal mine requires construction of a low level crossing over the Isaac River, as well as an underpass beneath the Peak Downs Highway and would be located within MLA70380 and MLA70382 for infrastructure only. The expansion area is a satellite deposit located to the south-southeast of the existing Isaac Plains coal mine.

The existing Isaac Plains coal mine is located approximately 8km north-northwest of the proposed expansion area and about 4.5km east of the Moranbah township. The Isaac Plains coal mine is an open-cut, truck and shovel operation currently approved to mine at a rate of 1.9 Mt/y of ROM coal, producing a nominal annual average of 1.6Mt/y of product coal.

IP Coal Pty Ltd and Vale Australia (IP) Pty Ltd propose to operate the IIPP as a contractor-operated, open-cut dragline operation producing a combined throughput (i.e. existing operation and proposed expansion area) of up to 4Mt/y of ROM coal for a nominal annual average of 3.3Mt/y of product coal over a 15 year mine life. It is proposed to replace the truck and shovel fleet at the existing Isaac Plains coal mine with a dragline until the coal resource is depleted in approximately 2016. Meanwhile the expansion area will be prepared for mining. Then when the dragline is available it will be walked over the low level crossing of the Isaac River to commence operating in the expansion area.

The IIPP will use some existing infrastructure and facilities, such as the CHPP and rail loop and rail loading facilities, located at the Isaac Plains coal mine, thereby minimising the disturbance footprint. The construction workforce for the expansion area will consist of 20-40 employees for approximately three to six months. Assembly of the dragline will also require a peak workforce of 70 employees for twelve months. The operational workforce for the IIPP will increase by 40 persons, from 70 existing employees to 110 employees. About 95% of the construction and operation workforces are proposed to be housed in the MAC Coppabella Camp on the Peak Downs Highway, approximately 26km east of the IIPP and approximately 50km east of Moranbah. Approximately 5% of the construction and operational workforces are anticipated to live in Moranbah.

The target coal seams for the expansion area are the Leichhardt seam and the upper Vermont seams in the Rangal Coal Measures. Mining these coal seams will produce approximately 25% coking coal, 50% pulverised coal injection (PCI) and 25% thermal coal for the export market via rail transport to the Dalrymple Bay coal terminal near Mackay.

The proposed residual void for the expansion area remaining at the end of the mine life will be up to 80m deep over an area of 26ha and will be above the probable maximum flood (PMF) level of the Isaac River.

Approximately a 2.4km length of Conrock Gully (an ephemeral tributary of the Isaac River) traversing the open-cut pits at the expansion area is proposed to be diverted north to the Isaac River to allow access to an economic coal reserve identified beneath the current Conrock Gully alignment. The Department of Natural Resources and Water has determined that Conrock Gully is not a defined watercourse under the provisions of the *Water Act 2000* and does not require a riverine protection permit. The proposed 6.2km diversion has been assessed and

designed using the Australian Coal Association Research Program (ACARP) stream diversion design criteria. The proposed diversion channel requires the construction of a dam at the western boundary of MLA70361 of the expansion area to raise water levels and increase the head sufficiently for water to discharge under gravity into the diversion channel. The dam reservoir area will cover approximately 25ha with a storage capacity of about 318ML and extend off-lease beyond the western boundary of MLA70361. Prior to the end of mine life the Conrock Gully dam is proposed to be decommissioned and backfilled with compacted overburden to natural ground level to restore free drainage into the diversion channel without ponding water. The proponent is currently in negotiation with the tenure holders, Anglo Coal and Exxaro, for consent to apply for an MLA over the dam reservoir area.

Approximately a 1.2km length of Smoky Creek (an ephemeral tributary of the Isaac River) traversing the open-cut pits at the existing Isaac Plains coal mine is proposed to be diverted to the south to allow access to an economic coal reserve beneath the current Smoky Creek alignment identified subsequent to approval of the existing Isaac Plains coal mine. The former Department of Natural Resources and Water determined that Smoky Creek is a defined watercourse under the provisions of the *Water Act 2000* and will require a riverine protection permit. The proposed diversion is not anticipated to change the catchment area contributing to Smoky Creek and flood flows along the new alignment are expected to remain unaltered.

Groundwater inflows to the pit in the expansion area are expected to be minimal due to the poor water yielding characteristics of the alluvial sediments and Rangal Coal Measures indicated by the historically low levels of dewatering required in the pits at the current operation. Advanced pit dewatering appears unnecessary and groundwater inflows to the pit will be collected in sumps constructed on the pit floor to achieve a dry pit during mining.

1.2 Approvals

The following approvals are required for the Integrated Isaac Plains Project:

Approval	Legislation (Administering Authority)
Environmental authority (mining activities)	<i>Environmental Protection Act 1994</i> (Department of Environment and Resource Management)
Mining Leases (MLA70361 and MLA70381 for mining; MLA70380 and MLA70382 for transport corridor infrastructure; and an MLA application over the Conrock Gully diversion dam reservoir area.	<i>Mineral Resources Act 1989</i> (Department of Employment, Economic Development and Innovation)
Cultural Heritage Management Plan	<i>Aboriginal Cultural Heritage Act 2003</i> (Department of Environment and Resource Management)
A riverine protection permit for the low level crossing of the Isaac River and Smoky Creek diversion	<i>Water Act 2000</i> (Department of Environment and Resource Management)
A water licence for taking or interfering with sub-artesian water (pit dewatering)	
Waterway barrier works approval (construction of low level crossing over the Isaac River)	<i>Fisheries Act 1994</i> (Department of Employment, Economic Development and Innovation)

1.3 Impact assessment process

1.3.1 The EIS process

The EIS for the IIPP was conducted under Chapter 3 of the EP Act. The EIS process was initiated by the management company, IPCM, acting on behalf of the project proponents, by application to the former Environmental Protection Agency (EPA) to prepare a voluntary EIS for the IIPP to allow extension of the existing Isaac Plains coal mine into the expansion area. An assessment level decision was made on 9 June 2006 that an EIS was required for the proposed IIPP and the proponent was notified of the decision on 21 June 2006.

The EPA approved the draft TOR and issued a notice of publication of draft TOR to IPCM on 3 November 2006. The comment period was set at 30 business days. The draft TOR were available for public comment from 6

November 2006 until 15 December 2006 with the EPA placing a public notice on the EPA's website on 3 November 2006 and in The Courier-Mail and Mackay Daily Mercury on 4 November 2006. IPCM issued copies of the public notice to affected and interested persons.

The EPA received 11 submissions on the draft TOR within the public comment period. Submissions were received from nine State government departments and agencies, one local government and one non-government organisation. These submissions, together with one from the EPA, were forwarded to the proponent on 15 January 2007. Matrix+ Consulting, on behalf of IPCM, responded to the comments on 23 February 2007. The EPA considered all submissions received on the draft TOR and the response submitted by Matrix+ Consulting prior to issuing the final TOR to the proponent on 23 March 2007.

Matrix+ Consulting, on behalf of IPCM, submitted the draft EIS on 5 September 2007 to the EPA for review prior to public notification. The EPA compared the draft EIS to the final TOR and on 2 October 2007 decided to issue an extension notice to IPCM until 17 October 2007 to allow amendments to be made to the draft EIS. An amended draft EIS was received by the EPA on 16 October 2007 and after comparison with the final TOR a decision to allow the EIS to proceed was made on 17 October 2007. The notice of decision to allow the submitted EIS to proceed to public notification was issued to IPCM on 24 October 2007. The submission period was set at 30 business days.

The draft EIS was available for public submissions for 30 business days from 12 November 2007 to 8 January 2008. IPCM placed a public notice in the Mackay Daily Mercury on 7 November 2007 and in The Courier-Mail on 10 November 2007, and the EPA placed a public notice on the Agency website. IPCM also issued copies of the public notice to affected and interested persons and made the EIS documents available on the Matrix+ Consulting website.

The EPA received 14 submissions from government and non-government organisations on the draft EIS within the submission period. Submissions were received from 10 State government departments and agencies, two local governments, and two non-government organisations. The EPA also received from Belyando Shire Council (now Isaac Regional Council) 377 public submissions on the draft EIS addressed to Belyando Shire Council. These submissions, together with one from the EPA, which were initially due to be submitted to IPCM on 22 January 2008, but were delayed due to the declared disaster zone in central Queensland as a result of severe flooding, and were eventually forwarded to IPCM on 19 February 2008 for consideration and response. Matrix+ Consulting on behalf of IPCM submitted a response to submissions (referred to hereafter as the supplementary EIS) to the EPA on 6 June 2008.

On 10 June 2008, copies of the supplementary EIS were issued to those members of the advisory body who had previously requested additional information. These advisory body members were requested to consider the supplementary EIS, in context with the EIS, and provide comments by 25 June 2008.

The EPA received 11 submissions on the supplementary EIS. This included 10 submissions from State government departments and agencies and one submission from a local government.

On 4 July 2008 IPCM was notified that the administering authority had decided to extend until 29 August 2008 the decision under s56A about whether to allow the submitted EIS to proceed under Chapter 3, Divisions 5 and 6 of the EP Act. The reasons for the extension was to allow IPCM time to provide further information in response to the advisory body comments about the impacts of the project and proposed mitigation measures and make all appropriate amendments to the submitted EIS. The administering authority advised the proponent that once the additional information and amendments had been undertaken the decision to allow the EIS to proceed would be made.

An Addendum to the supplementary EIS titled, "Response to EPA Comments, Supplementary IIPP EIS, Version 1" was received on 29 August 2008 and the s56A decision was extended until 10 November 2008 so copies of the Addendum could be issued to those members of the advisory body whose concerns had not been adequately addressed in the supplementary EIS.

Three submissions, including two from State Government agencies and one from a local government, were received on the Addendum.

In response to queries on the Addendum, the proponent provided additional information on 10 November 2008 and 28 November 2008 that constitutes part of the EIS. The s56A decision was extended until 19 December

2008 so copies of the additional information could be issued to the advisory body members whose concerns had not previously been adequately addressed in the Addendum.

Upon review of the additional information two key outstanding issues remained. One related to the post-mining landform design in the floodplain of the Isaac River and the other related to the proposed Conrock Gully diversion dam reservoir area being situated outside current mining lease areas.

Consequently, on 19 December 2008 the administering authority decided to further extend the s56A decision until 13 February 2009 to allow time for:

- the proponent to address the key outstanding issues and submit a revised, consolidated EIS covering all current project proposals;
- the proponent and the EPA to meet and discuss the proposed response to outstanding project issues; and
- the EPA to consider the response to outstanding project issues and make a decision under s56A.

On 30 January 2009 the EPA extended the s56A decision until 27 March 2009 because a suitable meeting date to discuss the outstanding issues could not be arranged within the statutory timeframe.

The EPA decided under s56A of the EP Act on 13 March 2009 that the submitted EIS should proceed under Division 5 (EIS assessment report) and Division 6 (Completion of process). A notice of the decision to allow the submitted EIS to proceed, together with a copy of this EIS assessment report, will be issued to the proponent on 27 March 2009.

The DERM in the preparation of this EIS assessment report has considered comments from the advisory body and other interested parties made at all stages of the EIS process. This EIS assessment report will be available to the public on the DERM's website (www.epa.qld.gov.au).

1.3.2 Consultation program

Public consultation

In addition to the statutory requirements for public notification of the TOR and draft EIS and identification of interested and affected parties, the proponent undertook community consultation with affected landowners and government agencies prior to the submission of the draft EIS. Matrix+ Consulting, on behalf of IPCM, also made available information about the IIPP on their website.

Advisory Body

The former EPA invited the following organisations to assist in the assessment of the TOR and EIS by participating as members of the advisory body for the IIPP:

- Department of Natural Resources and Water;
- Department of Primary Industries and Fisheries;
- Department of Infrastructure and Planning;
- Queensland Health;
- Department of Main Roads;
- Queensland Transport;
- Agforce;
- Sunwater;
- Nebo-Broadsound Landcare Group;
- Capricorn Conservation Council;
- Nebo Shire Council;
- Belyando Shire Council;
- Department of Housing;
- Department of Emergency Services;
- Queensland Police Service;
- Central Highlands Regional Resource Use Planning and Co-operative;
- Fitzroy Basin Association;
- Department of Mines and Energy;
- Department of Communities;

- Mackay City Council;
- Clermont Fish Stocking Group Inc;
- Emerald Fish Stocking Group Inc;
- Mackenzie River Fish Stocking Association Inc; and
- Sunfish Mackay.

Advisory body briefings were held Brisbane during the draft TOR stage of the EIS process, and in Mackay during the draft EIS stage of the EIS process.

Public notification

In accordance with the statutory requirements, advertisements were placed in The Courier-Mail and the Mackay Daily Mercury to notify the availability of the draft TOR and draft EIS for review and public comment as stated in Section 1.3.1 above. In addition, notices advising the availability of the draft TOR and the draft EIS for public comment were displayed on the former EPA website.

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

- EPA Website (draft TOR and IAS only);
- EPA Customer Services Centre, EPA Central Office, Brisbane;
- EPA Whitsunday/Coalfields Office, Emerald;
- Matrix+ Consulting Website;
- Matrix+ Consulting, Brisbane (copies of the draft EIS could also be purchased);
- Moranbah Public Library; and
- Nebo Shire Council (draft EIS only).

1.3.3 Environment Protection and Biodiversity Conservation Act 1999

The proposal to extend the existing Isaac Plains coal mine into the expansion area was referred (EPBC referral 2006/3043) under section 68 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the then Commonwealth Department of the Environment and Heritage (now known as the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA)) on 8 September 2006. A decision that the proposed project was not a controlled action was made by DEWHA on 6 October 2006.

2 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:

- (a) the final TOR for the EIS;
- (b) the submitted EIS;
- (c) all properly made submissions and any other submissions accepted by the chief executive;
- (d) the standard criteria;
- (e) another matter prescribed under a regulation.

These matters are addressed in the following subsections.

2.1 The final TOR

The final TOR document, issued on 23 March 2007, was 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 to be interpreted as excluding 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.

2.2 The submitted EIS

The "submitted EIS" was considered when preparing this EIS assessment report. The "submitted EIS" comprised the:

- (i) draft EIS that was publicly released on 12 November 2007;

- (ii) supplementary report titled, "Integrated Isaac Plains Project, Response to Stakeholder Comments on the Draft Environmental Impact Statement, June 2008";
- (iii) addendum report titled, "Response to EPA Comments, Supplementary IIPP EIS, Version 1, 29 August 2008;
- (iv) letter from Isaac Plains Coal Management dated 10 November 2008 containing revised post-mining landform designs;
- (v) letter from Isaac Plains Coal Management dated 28 November 2008 containing additional project information, including a report on Conrock Gully diversion concept design;
- (vi) revised EM plan dated December 2008; and
- (vii) amalgamated EIS Version 1, including a revised EM plan, dated February 2009.

2.3 Properly made submissions

The former EPA received a total of 406 submissions on the submitted EIS over its various stages. All submissions were properly made and all were considered when preparing this EIS assessment report.

2.4 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;*
- (b) *any applicable environmental protection policy;*
- (c) *any applicable Commonwealth, State or local government plans, standards, agreements or requirements;*
- (d) *any applicable environmental impact study, assessment or report;*
- (e) *the character, resilience and values of the receiving environment;*
- (f) *all submissions made by the applicant and submitters;*
- (g) *the best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows—*
 - (i) *an environmental authority;*
 - (ii) *an environmental management program;*
 - (iii) *an environmental protection order;*
 - (iv) *a disposal permit;*
- (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;*
- (i) *the public interest;*
- (j) *any applicable site management plan;*
- (k) *any relevant integrated environmental management system or proposed integrated environmental management system;*
- (l) *any other matter prescribed under a regulation.*

The DERM has considered the standard criteria when assessing the IIPP. With regard to criterion (l), there was no other matter prescribed under a regulation that required consideration.

3 Recommendations for conditions for any approval

There is an existing environmental authority (EA) MIN100329505 for the Isaac Plains coal mine. The original EA was granted in 2006. Since that time, best practice management and continual improvement has progressed significantly and a number of advances in conditioning requirements have taken place. Consequently, a number of conditions from the existing EA require amendment or replacement. These conditions are listed below without any additional explanatory text and should be inserted in the relevant parts of the EA or replace existing conditions as required. Some of the conditions outlined below are introduced with explanatory text as these have been developed specifically for the IIPP and relate to issues identified during the EIS process.

It is recommended that the conditions in the existing EA should apply to the IIPP except as detailed below and where recommendations are made in the following sections of this report to amend or add to those conditions.

3.1 Recommendations for amended or new conditions

Department Interest: Air

20.5.4 Proposed EA Conditions – Air

Section 20.5.4 of the EM plan outlines proposed air management and monitoring conditions for the IIPP. Condition B1-3 outlines the air quality monitoring dust deposition and PM₁₀ limits. The proposed PM₁₀ limit states:

"The net contribution of the mine to the ambient concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time for more than five times per year, at a sensitive or commercial place downwind of the operational land "

This appears to indicate that the mine can contribute an additional 50µg/m³ over a 24-hour averaging time to the existing background PM₁₀ concentrations. However, this is inconsistent with the new *Environmental Protection (Air) Policy 2008* which stipulates an absolute limit of 50µg/m³ over a 24-hour averaging time for more than 5 times per year. This limit is a National Environmental Protection Measure established for the protection of human health and well-being. Consequently the proposed EA condition B1-3 should be amended as follows:

- B1-3** *When requested by the administering authority or as a result of a complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer), dust and particulate monitoring must be undertaken, and the results thereof notified to the administering authority within **fourteen (14) days** following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place. Dust and particulate matter must not exceed the following levels when measured at any nuisance sensitive or commercial place:*
- a) *Dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); and*
 - b) *A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM₁₀) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site, when monitored in accordance with:*
 - i. *Australian Standard AS 3580.9.6 of 2003 (or more recent editions) Ambient air - Particulate matter - Determination of suspended particulate PM₁₀ high-volume sampler with size-selective inlet -Gravimetric method; or*
 - ii. *any alternative method of monitoring PM₁₀ which may be permitted by the Air Quality Sampling Manual as published from time to time by the administering authority.*

20.6.6 Proposed EA Conditions - Water

Section 20.6.6 of the EM plan outlines proposed water management and monitoring conditions for the IIPP. There is limited surface water quality data for the current site. Consequently it has been difficult to develop end-of-pipe and receiving environment water quality limits for the IIPP.

The DERM, in consultation with its water scientists has developed an interim approach to water management and monitoring where no or limited background water monitoring data is available for a site. The key changes to previous water licence conditions include the following:

- upstream, downstream and end-of-pipe sampling for metals, petroleum hydrocarbons, ammonia and nitrate during discharge and associated end-of-pipe and receiving environment trigger values;
- a maximum end-of-pipe electrical conductivity trigger value of 1400µS/cm to protect downstream aquatic ecosystems;
- a minimum upstream flow volume for controlled releases based on historical measurements of upstream natural flow, designed to avoid times of poor mixing and flushing;

- a maximum controlled discharge rate not exceeding 20% of the specified minimum upstream flow volume;
- a non-discharge water quality monitoring program to expand the background dataset to allow review and development of site specific end-of-pipe and receiving water trigger values/release limits; and
- stream sediment monitoring to identify cumulative impacts.

The interim approach is based on setting end-of-pipe and receiving water limits for pH, Electrical Conductivity (EC) and turbidity and trigger values for metals and other significant toxicants. Condition C18 requires ongoing background water quality monitoring for physico-chemical parameters during all non-discharge flow events to expand the ambient dataset so the existing end-of-pipe and receiving water limits can be refined with a high level of confidence, if necessary.

Upstream, mid-stream and downstream monitoring locations for the Conrock Gully and Smokey Ck Diversions should also be included in Table 6 (Receiving environment monitoring locations and frequency).

Consequently, the proposed EA conditions in Section 20.6.6 of the EM plan should be replaced with the following:

Department Interest: Water

C1 Authorised Releases

Process water and storm water contaminated by mining activities must only be released to surface waters at the authorised discharged points as defined in Table 1 (Discharge locations) and in compliance with the release limits defined in Table 2 (End of pipe contaminant release limits).

Table 1 (Discharge locations)

Authorised discharge point	Latitude (GDA94)	Longitude (GDA94)	Location description
Discharge Point 1	XXXXXX	XXXXXX	XXX Dam
Discharge Point 2	XXXXXX	XXXXXX	XXX Dam
Discharge Point 3	XXXXXX	XXXXXX	XXX Dam
Discharge Point 4	XXXXXX	XXXXXX	XXX Tailings Dam

Table 2 (End of pipe contaminant release limits)

Quality characteristic	Units	Minimum	Maximum
pH	pH units	6.5	8.5
Electrical Conductivity	µS/cm	N/A	1400 (maximum)
Turbidity	NTU	N/A	≤ upstream value

C2 If end of pipe water quality during authorised release flow events exceed any of the contaminant trigger levels stated in Table 3 (End of pipe contaminant trigger levels), the environmental authority holder must:

- complete an investigation in accordance with the ANZECC (2000) methodology, into the potential for environmental harm; and
- provide a written report to the administering authority within twenty-eight (28) days of the date of the original exceedence, outlining:
 - details of the investigations carried out; and
 - actions taken to prevent environmental harm.

Table 3 (End of pipe contaminant trigger values)

Quality characteristic	Units	Minimum	Maximum
Aluminium	µg/L	N/A	150
Ammonia	µg/L	N/A	1000
Total Arsenic	µg/L	N/A	13
Boron	µg/L	N/A	370
Cadmium	µg/L	N/A	1
Chromium (CrVI)	µg/L	N/A	40
Copper	µg/L	N/A	2.5
Iron	µg/L	N/A	10
Lead	µg/L	N/A	9.4
Manganese	µg/L	N/A	3600
Mercury (inorganic)	µg/L	N/A	0.06
Molybdenum	µg/L	N/A	1
Nickel	µg/L	N/A	17
Nitrate (NO ₃)	µg/L	N/A	7600
Petroleum Hydrocarbons (C6-C9)	µg/L	N/A	20
Petroleum Hydrocarbons (C10-C36)	µg/L	N/A	100
Phosphate (PO ₄) (Filterable reactive phosphate)	µg/L	N/A	30
Selenium (total)	µg/L	N/A	34
Sulphate	mg/L	N/A	500
Total Suspended Solids	µg/L	N/A	200
Zinc	µg/L	N/A	31

Note: Metals to be measured for total and dissolved

- C3** End of pipe release limits for process water and storm water contaminated by mining activities must be monitored at the locations and frequencies defined in Table 4 (End of pipe monitoring locations and frequencies), and comply with the contaminant limits defined in Table 2 (End of pipe contaminant release limits).

Table 4 (End of pipe monitoring locations and frequencies)

Monitoring Point	Location Description	Latitude (GDA94)	Longitude (GDA94)	Frequency
Monitoring Point 1	XXXXXX	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 3.

Monitoring Point 2	XXXXX	XXXXX	XXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 3.
Monitoring Point 3	XXXXX	XXXXX	XXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 3.

- C4** Authorised releases of process water and storm water contaminated by mining activities to the receiving environment in accordance with conditions **C1** and **C2** shall be only during periods of natural flow events in compliance with Table 5 (Flow events for authorised discharge) upstream of the associated discharge point.

Table 5 (Flow events for authorised discharge)

Flow Monitoring Point	Monitoring Point Description	Latitude (GDA94)	Longitude (GDA94)	Minimum	Frequency
Monitoring Point 1	xxxxx Creek Upstream	XXXXXX	XXXXXX	X m ³ /sec	Daily during discharge
Monitoring Point 2	xxxxx Creek Upstream	XXXXXX	XXXXXX	X m ³ /sec	Daily during Discharge
Monitoring Point 3	xxxxx Creek Upstream	XXXXXX	XXXXXX	X m ³ /sec	Daily during Discharge

Note: Minimum flow can vary from but there must be a measurable volume

- C5** Discharge volumes must be monitored at the monitoring points and at the frequencies specified in Table 4 (End of pipe monitoring locations and frequencies).
- C6** The volume of wastewater discharged into a waterway at the authorised discharge points in Table 1 (Discharge locations) must not exceed 20 per cent of the natural flow volume of the receiving waterway as measured at the corresponding upstream flow monitoring point specified in Table 5 (Flow events for authorised discharges).
- C7 Notification of Discharge**
- The authority holder must within 24 hours prior to a discharge notify the administering authority by email or facsimile the following information:
- discharge date;
 - is the discharge in accordance with the Environmental Authority, Transitional Environmental Program, Emergency Direction or an unauthorised discharge;
 - discharge point/s;
 - receiving water/s;
 - is the discharge quality limits in accordance with EA limits;
 - flow volume of natural waterway;
 - discharge volume (estimated);
 - end of pipe water quality parameters in accordance with EA; and

- i) upstream and downstream compliance point water quality parameters in accordance with EA.
- C8** The authority holder must, within 24 hours after discharge has ceased, provide email or facsimile notification to the administering authority including updated information required in Condition C6.
- C9** If the end of pipe contaminant limits defined in Table 2 (End of pipe contaminant release limits) are exceeded then the environmental authority holder must notify the administering authority within fourteen (14) days of receiving the analysis results.
- C10** The authority holder must, within twenty-eight (28) days of a water release, provide a report to the administering authority detailing:
- the reason for the release;
 - the location of the release;
 - all water quality monitoring results;
 - any general observations;
 - all calculations; and
 - any other matters pertinent to the water release event.
- C11** In addition to the quality characteristic limits specified in Table 2 (End of pipe contaminant release limits), process water and storm water contaminated by mining activities released in accordance with conditions C1-C5 must not have any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm.
- C12** **Receiving waters**
 Waters must be monitored during discharge events at the locations and frequencies defined in Table 6 (Receiving water monitoring locations) and for the parameters specified in Table 7 (Receiving water contaminant limits) and Table 8 (Receiving water condition indicators and monitoring frequencies) and Table 9 (Receiving water contaminant trigger values).

Table 6 (Receiving water monitoring locations and frequency)

Sampling location	Location Description	Latitude (GDA94)	Longitude (GDA94)	Frequency
Upstream Reference Point				
Monitoring Point 1	xxxxx Creek Upstream	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 9
Monitoring Point 2	xxxxx Creek Diversion Upstream	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 9
Downstream Reference Point				
Monitoring Point 3	xxxxx Creek Downstream	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge

				and weekly thereafter for parameters in Table 9
Monitoring Point 4	xxxxx Creek Diversion Mid-stream	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 9
Monitoring Point 5	xxxxx Creek Diversion Downstream	XXXXXX	XXXXXX	Daily during discharge for pH, Turbidity, EC. Once on first discharge and weekly thereafter for parameters in Table 9

Note: 1. Upstream reference point - No mine within 20km.

2. Downstream reference point – No greater than 50m from discharge point

C13 Monitoring results from sampling at the locations defined in Table 6 (Receiving water monitoring locations and frequency) must comply with the contaminant limits defined in Table 7 (Receiving water contaminant limits).

Table 7 (Receiving water contaminant limits)

Parameter	Unit	Receiving Water Limits	Limit Type
pH	pH units	6.5 – 8.5	Minimum - Maximum
Electrical Conductivity	µS/cm	1000	Maximum

C14 If the receiving water contaminant defined in Table 8 (Receiving water condition indicators and monitoring frequencies) are detected then the environmental authority holder must notify the administering authority within **fourteen (14) days** of receiving the analysis results.

Table 8 (Receiving water condition indicator and monitoring frequency)

Parameter	Unit	Frequency
Chlorophyll A	µg/L	Daily during discharge from the identified discharge location associated with the monitoring point in Table 6 (Receiving water monitoring locations and frequency).

C15 If water quality of the receiving waters during authorised release flow events exceed any of the contaminant trigger levels stated in Table 9 (Receiving water contaminant trigger levels), the environmental authority holder must:

- c) complete an investigation in accordance with the ANZECC (2000) methodology, into the potential for environmental harm; and
- d) provide a written report to the administering authority within twenty-eight (28) days of the date of the original exceedence, outlining:
 - i) details of the investigations carried out; and
 - ii) actions taken to prevent environmental harm.

Table 9 (Receiving water contaminant trigger levels)

Parameter ¹	Unit	Trigger Levels
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Aluminium	µg/L	55 (pH > 6.5)
Ammonia	µg/L	900 (pH = 8) 2180 (pH < 7) 180 (pH > 9)
Antimony	µg/L	9
Arsenic (As III)	µg/L	24
Boron	µg/L	370
Cadmium	µg/L	0.2
Chromium (CrVI)	µg/L	1
Copper	µg/L	1.4
Iron	µg/L	300
Lead	µg/L	3.4
Manganese	µg/L	1900
Mercury (inorganic)	µg/L	0.06
Molybdenum	µg/L	34
Nitrate (NO ₃)	µg/L	100
Nickel	µg/L	11
Petroleum hydrocarbons (C6-C9)	µg/L	20
Petroleum hydrocarbons (C10-C36)	µg/L	100
Phosphate (PO ₄) (Filterable reactive phosphate)	µg/L	30
Selenium (Total)	µg/L	5
Sulphate	µg/L	1000
Total Suspended Solids	µg/L	200
Zinc	µg/L	8

Note 1: All parameters are dissolved unless specified.

C16 Water Monitoring

The following information must be recorded in relation to all water sampling required under Agency Interest: Water –

- the date on which the sample was taken;
- the time at which the sample was taken;
- the monitoring point at which the sample was taken;
- the measured or estimated upstream daily flow volume at the time of sampling; and
- the results of all monitoring.

C17 The method of water sampling required by this environmental authority must comply with that set out in the current edition of the Environmental Protection Agency's Water Quality Sampling Manual.

Non-Discharge Water Quality Monitoring

- C18** The authority holder must collect water quality samples in accordance with Table 10 (Non-Discharge Water Quality Monitoring and Frequency) during natural flow events, when the authority holder is not discharging, from locations specified in Table 6 (Receiving water monitoring locations and frequency). The monitoring data must be submitted annually with the annual return.

Table 10 (Non-Discharge Water Quality Monitoring and Frequency)

Parameter	Unit	Frequency
Electrical Conductivity	µS/cm	Upon commencement of natural flow, then weekly during natural flow.
pH	pH units	Upon commencement of natural flow, then weekly during natural flow.
Total Suspended Solids	mg/L	Upon commencement of natural flow, then weekly during natural flow.
Flow rate	m ³ /sec	Upon commencement of natural flow, then weekly during natural flow.

C19 Water Sediment controls

All reasonable and practicable erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the movement of sediment, including:

- a) all clean waters, from undisturbed areas, kept separate from dirty waters from disturbed areas;*
- b) water from disturbed catchments diverted into the mine water management system and sedimentation dams;*
- c) new sedimentation dams designed to capture the sediment volume calculated for the catchment area for a 24 hour 10 year annual recurrence interval (ARI) storm event; and*
- d) sediment shall be excavated from sediment dams as required to maintain design capacity.*

Water and stormwater management

- C20** A water management, erosion and sediment control plan must be prepared and implemented prior to commencement of mining activities in the expansion area and must include a site water balance indicating sources and quality of water for mining activity use, contact testing of relevant overburden, ore and waste material from the site, as well as identifying methods to:

- a) determine the adequacy of the system to prevent unauthorised discharges during Average Recurrence Interval (ARI) 1 in 25, 1 in 50, 1 in 100, 1 in 200, and 1 in 1000 year rainfall events considering both an operational water balance and the ability to deal with rainfall events that may occur on site at any time;*
- b) undertake the application of 'time of concentration' design rainfall events for catchments contributing to individual relevant dams or storages or to groups of dams or storages, under conditions arising from water balance modelling or more conservative alternatives; so as to determine the failure outcomes for worst case contaminant release including overtopping and likely collapse of structures and the Annual Exceedence Probability (AEP) levels at which such outcomes occur;*
- c) develop and implement control measures for routine operations to minimise the likelihood of environmental harm;*
- d) manage seepage and drainage for all hazardous or regulated dams and storages on site;*

- e) undertake erosion control mitigation measures for the site for areas that drain or lead directly to receiving waters;
- f) prevent contamination of stormwater and manage on-site overland water flows;
- g) develop and implement contingency plans and emergency procedures for non-routine situations;
- h) develop and implement a system for emergency spills or discharges;
- i) manage off site water releases and minimise sediments and salinity releases;
- j) incorporate a risk management approach to how changing levels of floods, drought and water quality risks should be addressed;
- k) minimise the potential for soil and spoil erosion, soil contamination and acid rock drainage, particularly with regard to first flush flows following rainfall events;
- l) review and monitor the water management system, hydrological processes performance indicators and sediment retention pond capacities to ensure the release limits defined in **Agency Interest: Water** are met; and
- m) develop and implement an annual review of environmental performance and continual improvement.

Stream sediment contaminant levels

- C21** The environmental authority holder must undertake an investigation of the bed of the receiving waters, affected by the release of process water and storm water contaminated by the mining activities and submit the final report to the DERM within 6 months of issue of this environmental authority.
- C22** At each receiving waterway, in intervals of 50m, 100m, 200m and 500m from the discharge location, composite stream sediment samples must be taken, and a composite upstream sample at each reference site. A record must be kept for each sample location and include GDA94 co-ordinates.

Table 10: Receiving stream sediment monitoring locations and frequency

Sampling location	Location Description	Latitude (GDA94)	Longitude (GDA94)	Monitoring frequency
Receiving waters				
Monitoring Point 1	Downstream XXXX Creek	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 2	Downstream xxxxx	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 3	Downstream xxxx Creek at lease boundary	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 4	Downstream xxxx Creek Discharge Point 1	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Reference sites				

Monitoring Point 5	Upstream XXXX Creek Reference site for Monitoring Point 1	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 6	Upstream xxxx Creek Reference site for Monitoring Point 2	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 7	Upstream xxxxx Creek. Reference site for Monitoring Point 3.	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.
Monitoring Point 8	Upstream xxxx Creek. Reference site for Monitoring Point 4	XXXX	XXXX	Once on first discharge and weekly there after until discharge has ceased.

C23 If the stream sediment quality at receiving waters exceed any of the contaminant trigger levels stated in Table 11 (Receiving stream sediment contaminant trigger levels), the environmental authority holder must:

- complete an investigation in accordance with the ANZECC (2000) methodology, into the potential for environmental harm;
- details of the investigations carried out; and
- actions taken to prevent environmental harm during discharges and remediate the existing stream bed disturbance.

Table 11: Receiving stream sediment contaminant trigger levels

Parameter	Unit	Trigger Levels
Acid Volatile Sulfides ¹	mg/Kg of dry weight	-
Antimony ¹	mg/Kg of dry weight	2
Aluminium ¹	mg/Kg of dry weight	-
Ammonia ¹	mg/Kg of dry weight	-
Total Arsenic	mg/Kg of dry weight	20
Boron ¹	mg/Kg of dry weight	-
Cadmium ¹	mg/Kg of dry weight	1.5
Chromium ¹	mg/Kg of dry weight	80
Copper ¹	mg/Kg of dry weight	65
Lead ¹	mg/Kg of dry weight	50
Iron ¹	mg/Kg of dry weight	-
Manganese ¹	mg/Kg of dry weight	-
Mercury ¹	mg/Kg of dry weight	0.15
Molybdenum ¹	mg/Kg of dry weight	-
Nickel ¹	mg/Kg of dry weight	21
Thallium ¹	mg/Kg of dry weight	-
Selenium ¹	mg/Kg of dry weight	-

Silver ¹	mg/Kg of dry weight	1
Vanadium ¹	mg/Kg of dry weight	-
Zinc ¹	mg/Kg of dry weight	200

¹ All parameters are to be measured as dilute-acid-soluble metal concentration, unless otherwise stated.

² Where (-) indicates the value, any detection of the contaminant is required to be reported to the administering authority.

C24 The authority holder must, within **twenty-eight (28) days** of receiving analysis results indicating that the receiving water limits defined in Table 11: Receiving stream sediment condition indicators have been exceeded, provide a report to the administering authority detailing:

- the monitoring location at which the receiving water nutrient triggers were detected;
- all water nutrient quality monitoring results for reference and impacted sites;
- any general observations;
- all calculations; and
- any other matters pertinent to the monitoring.

C25 All stream sediment sampling must be undertaken in accordance with AS5667.1 Guidance on Sampling of Bottom Sediments of 1998.

C26 Temporary Interference with waterways

Temporary destroying native vegetation, excavating, or placing fill in a watercourse, lake or spring necessary for and associated with mining operations must be undertaken in accordance with Department of Natural Resources and Water Guideline - Activities in a Watercourse, Lake or Spring associated with Mining Activities.

Groundwater

C27 If the groundwater investigation trigger levels defined in Table 11 (Groundwater investigation trigger levels) are exceeded then the environmental authority holder must complete an investigation into the potential for environmental harm and notify the administering authority with twenty-eight (28) days of receiving the analysis results.

Table 11 (Groundwater investigation trigger levels)

Parameter	Unit	Trigger Levels	Limit Type
pH	pH Units	6.5 - 8.5	Minimum/Maximum
Electrical Conductivity	µS/cm	To be provided	Maximum
Total Dissolved Solids	mg/L	To be provided	Maximum
Calcium	µg/L	To be provided	Maximum
Magnesium	µg/L	To be provided	Maximum
Sodium	µg/L	To be provided	Maximum
Potassium	µg/L	To be provided	Maximum
Chlorine	µg/L	To be provided	Maximum
SO4	µg/L	To be provided	Maximum



CO3	µg/L	To be provided	Maximum
HCO3	µg/L	To be provided	Maximum
Iron	µg/L	To be provided	Maximum
Aluminium	µg/L	To be provided	Maximum
Silver	µg/L	To be provided	Maximum
Arsenic	µg/L	To be provided.	Maximum
Mercury	µg/L	To be provided	Maximum
Antimony	µg/L	To be provided	Maximum
Molybdenum	µg/L	To be provided	Maximum
Selenium	µg/L	To be provided	Maximum
Total Petroleum Hydrocarbons	µg/L	To be provided	Maximum

Note: Trigger levels derived from existing groundwater monitoring data from unaffected sites

- C28** Groundwater levels and groundwater drawdown fluctuations in excess of 2m per year, not resulting from the pumping of licensed bores, must be notified within **seven (7) days** to the administering authority following completion of monitoring.
- C29** The groundwater monitoring data must be reviewed on an annual basis. The review must include the assessment of groundwater levels and quality data, and the suitability of the monitoring network. The assessment must be submitted to the administering authority within twenty-eight (28) days of receiving annual groundwater data.
- C30** The following information must be recorded in relation to all groundwater water sampling:
- the date on which the sample was taken;
 - the time at which the sample was taken;
 - the monitoring point at which the sample was taken; and
 - the results of all monitoring.

Section 20.6.5.3 Isaac River Buffer Zone

There is some concern by the DERM about the proximity of the proposed open-cut excavation at the northern most end of the expansion area to the high bank of the Isaac River. The proponent is proposing a minimum 100m buffer distance between the high bank of the Isaac River and the open-cut excavation. A minimum 50m of this buffer closest to the Isaac River is designated as a vegetation corridor. A 1-in-500-year average recurrence interval (ARI) (Q500) operational levee will take up the majority of the remaining 50m of the buffer zone up to the open-cut excavation. At the end of mine life the proponent proposes to raise the Q500 operational levee to the probable maximum flood (PMF) level. Section 20.6.5.3 of the EIS identifies that the footprint of the PMF levee in the vicinity of the Isaac River will be up to 75m wide. Therefore, the proposed PMF levee will not fit in the designated 50m wide corridor and up to 25m of the PMF levee would have to be constructed on backfilled open-cut pits to maintain the 50m wide vegetation corridor up to the high bank of the Isaac River. The DERM does not consider unconsolidated, partially compacted spoil in backfilled open-cut pits as a suitable foundation for constructing a post-mining landform levee which is meant to be, amongst other things, stable and self-sustaining. Consequently, the currently proposed minimum buffer distance of 100m between the high bank of the Isaac River and the open-cut excavation is inadequate.

Also of concern is the project's geological conditions identified in Section 7.1.4 Fault Zones in the EIS. Section 7.1.4 identifies 3 key issues including:

- extensive faulting throughout the expansion area;

- the regional Isaac thrust fault system is a major thrust fault that trends along the Isaac River; and
- thrust faults in the middle to northern section of the expansion area have caused throws of up to 25m.

The northern most end of the expansion area is significant for three reasons:

- it is the area of closest approach of open-cut mining to the high bank of the Isaac River;
- it is the deepest area of open-cut mining; and
- it is the area where faulting of rock is the greatest.

For the reasons identified above it is evident that during mining in the expansion area the highest risk of pit wall collapse is in the northern section of the open-cut pit closest to the Isaac River. A detailed investigation of geological conditions in the proposed pit wall near the river is required due to the significant consequences of failure or collapse of the mining wall near the river (i.e. stability of the Isaac River high bank and flood immunity levee bank).

The following additional EA conditions are recommended for inclusion in the draft EA to adequately identify the hazards, risks and consequences of mining walls within close proximity to the levee bank and high bank of the Isaac River and adjust the mine plan, if required:

- C31** *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 80m from the inside toe of the Q500 levee 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.*
- C32** *Prior to any advance of the excavation closer than 80m to the inside toe of the Q500 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 Q500 flood event in the Isaac River. This certified report will be treated as a design plan which is 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.*
- C33** *Where, on the basis of a satisfactory geotechnical report, open-cut mining advances closer than 80m to the inside toe of the Q500 levee, the excavations for mining must at all times and unconditionally leave a buffer distance of at least 30m between the inside toe of the Q500 levee and the highwall or endwall edge of the mine excavation.*
- C34** *The highwall or endwall edge of the mine excavation adjacent to, or parallel to, the Isaac River must at all times and unconditionally be at least 150m from the high bank of the Isaac River.*
- C35** *During mining operations the minimum 30m buffer between the inside toe of the Q500 levee and the highwall or endwall edge of the mine excavation must be monitored for signs of surface cracking. Any cracking or signs of highwall or endwall collapse must be reported to the administering authority within 24 hours.*

20.10.5 Environmental Protection Objectives and Strategies – Nature Conservation

Section 10.7 of the EIS identifies that approximately 68ha of remnant vegetation, including 25ha of Brigalow is proposed to be cleared for the IIPP, including for the Smoky Creek and Conrock Gully diversions. Furthermore, the vegetation along the Isaac River forms part of a regionally significant wildlife corridor, comprising remnant riparian vegetation immediately adjacent to the river and woodland on alluvial/flood plains further from the river. The regionally significant wildlife corridor will be impacted by clearing for the proposed low level crossing, mining pits and levee construction.

Section 20.10.5 of the EM plan includes a control strategy to offset the loss of the 68ha of remnant vegetation. This control strategy should be reflected as a condition of the nature conservation section of the EA as follows:

Department Interest: Nature Conservation

- H1** *The environmental authority holder must develop and submit to the administering authority within 6 months of issue of this environmental authority an offsets package in accordance with the Queensland Government Environmental Offsets Policy 2008 (QGEO) specific issue policy for vegetation management titled, "Policy for Vegetation Management Offsets, September 2007, Department of Natural*

Resources and Water” (or any other relevant specific issue offsets policy prepared under the QGEOP framework) to offset the loss of 68ha of remnant vegetation required to be cleared for the IIPP.

H2 *As a minimum requirement the offsets package must include the following:*

- (a) a proposed ecologically equivalent vegetation community to be managed and/or rehabilitated in perpetuity;*
- (b) agreement and commitment of parties to implement the offset package;*
- (c) a management plan including a map of the boundary of the proposed offset, environmental objectives, performance criteria, monitoring, reporting, corrective action, and responsibility and timing for permanent protection and management including control of weeds, cattle, site access, erosion and sedimentation and fire management.*

Other proposed conditions for general, noise and vibration, waste, land, dams and levees

It is recommended that the following conditions relating to general, noise and vibration, waste, land, and levees be included in the draft EA:

Department Interest: General

Prevent and/or minimise likelihood of environmental harm

- A3** *In carrying out the environmentally relevant activities, you must take all reasonable and practicable measures to prevent and / or to minimise the likelihood of environmental harm being caused. Any environmentally relevant activity, that, if carried out incompetently, or negligently, may cause environmental harm, in a manner that could have been prevented, shall be carried out in a proper manner in accordance with the conditions of this authority.*
- NOTE: This authority authorises the environmentally relevant activity. It does not authorise environmental harm unless a condition contained within this authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.*

Notification of emergencies, incidents and exceptions

- A5-1** *All reasonable actions are to be taken to minimise environmental harm, or potential environmental harm, resulting from any emergency, incident or circumstances not in accordance with the conditions of this environmental authority.*
- A5-2** *As soon as practicable after becoming aware of any emergency, incident or circumstances which results or may result in environmental harm not in accordance with the conditions of this environmental authority, the administering authority must be notified in writing.*
- A5-3** *Not more than ten (10) business days following the initial notification of an emergency, incident or circumstances which result or may result in environmental harm, written advice must be provided to the administering authority in relation to:*
- a) proposed actions to prevent a recurrence of the emergency or incident;*
 - b) the outcomes of actions taken at the time to prevent or minimise environmental harm; and*
 - c) proposed actions to respond to circumstances which result or may result in environmental harm.*
- A5-4** *As soon as practicable, but not more than six (6) weeks following the initial notification of an emergency, incident or circumstances which result or may result in environmental harm, environmental monitoring*

must be performed and written advice must be provided of the results of any such monitoring performed to the administering authority.

A5-5 Contaminants must not be released to the receiving environment unless they are in accordance with the contaminant limits authorised by this environmental authority.

A5-6 This environmental authority does not authorise environmental harm unless a condition contained within the authority explicitly authorises that harm. Where there is no condition or the authority is silent on a matter, the lack of a condition or silence shall not be construed as authorising harm.

Department Interest: Noise and vibration

D1 Noise nuisance

Noise from activities must not cause an environmental nuisance at any sensitive receptor or commercial place.

D2 All noise from activities must not exceed the levels specified in Table 11 (Noise limits) at any sensitive receptor or commercial place.

D3 Noise monitoring

When requested by the administering authority, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within fourteen (14) days to the administering authority. Monitoring must include:

- L_{A10} , adj, 10 mins
- L_{A1} , adj, 10 mins
- the level and frequency of occurrence of impulsive or tonal noise;
- atmospheric conditions including wind speed and direction;
- effects due to extraneous factors such as traffic noise; and
- location date and time of recording.

D4 Noise is not considered to be a nuisance under condition D1 if monitoring shows that noise does not exceed the following levels in the time periods specified in Table 11 (Noise limits).

Table 11 (Noise limits)

Noise level dB(A)	Monday to Sunday (including public holidays)		
	7am - 6pm	6pm - 10pm	10pm - 7am
Noise measured at a 'Sensitive Receptor'			
L_{A10} , adj, 10 mins	$B/g + 5$	$B/g + 5$	$B/g + 3$
L_{A1} , adj, 10 mins	$B/g + 10$	$B/g + 10$	$B/g + 8$
Noise measured at a 'Commercial place'			
L_{A10} , adj, 10 mins	$B/g + 10$	$B/g + 10$	$B/g + 5$
L_{A1} , adj, 10 mins	$B/g + 15$	$B/g + 15$	$B/g + 10$



- D5** The method of measurement and reporting of noise monitoring must comply with the current edition of the Environmental Protection Agency's Noise Measurement Manual.
- D6** If monitoring indicates exceedence of the relevant limits in Condition D4, then the environmental authority holder must:
- address the complaint including the use of appropriate dispute resolution if required; and
 - immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.
- D7** Prior to dragline use noise monitoring equipment must be installed between the current Isaac Plains coal mine and the Moranbah township. Real time results must be linked via telemetry to the proponent's website for public access and results updated no less than weekly.
- D8** At least 28 days prior to dragline use the environmental authority holder must submit to the administering authority a site shut-down procedure for the existing site and expansion area in the event of significant and sustained adverse meteorological conditions which may result in elevated noise emissions in the direction of the Moranbah township based on trends from background and/or ongoing monitoring results in condition D7. The site shut-down procedure must be implemented.

Department Interest: Waste

- E1** A designated area must be set aside for the segregation of economically viable, recyclable solid and liquid waste.
- E2** Records must be kept for five years, and must include the following information:
- date of pickup of waste;
 - description of waste;
 - cross reference to relevant waste transport documentation;
 - quantity of waste;
 - origin of the waste;
 - destination of the waste; and
 - intended fate of the waste, for example, type of waste treatment, reprocessing or disposal.

NOTE: Records of documents maintained in compliance with a waste tracking system established under the Environmental Protection Act 1994 or any other law for regulated waste will be deemed to satisfy this condition.

- E3** Records of trade and regulated wastes or material leaving the mining lease for recycling or disposal, including the final destination and method of treatment, must be in accordance with the Environmental Protection (Waste Management) Policy 2000.

Waste Management

- E4** A Waste Management Plan, in accordance with the Environmental Protection (Waste Management) Policy 2000, must be implemented and must cover:
- describe how the Integrated Isaac Plains coal mine recognise and apply the waste management hierarchy;
 - identify characterisations of wastes generated from the project and general volume trends over the past 5 years;

- c) a program for safe recycling or disposal of all wastes-reusing and recycling where possible;
- d) waste commitments with auditable targets to reduce, reuse and recycle;
- e) The waste management control strategies must consider:
 - o the type of wastes;
 - o segregation of the wastes;
 - o storage of the wastes;
 - o transport of the wastes;
 - o monitoring and reporting matters concerning the waste;
 - o emergency response planning;
 - o disposal, reused and recycling options;
- f) identify the potential adverse and beneficial impacts of the wastes generated;
- g) detail the hazardous characteristics of the waste generated (if any):
 - a) cover a disposal procedure for hazardous wastes;
 - b) outline the process to be implemented to allow for continuous improvement of the waste management systems;
 - c) identify responsible staff (positions) for implementing, managing and reporting the Waste Management Plan; and
 - d) cover a staff awareness and induction program that encourages re-use and recycling.

Department Interest: Land

Post Closure Management Plan

- F1** A Post Closure Management Plan for the site must be prepared at least 18 months prior to the final coal processing on site and implemented for a nominal period of:
 - a) at least thirty (30) years following final coal processing on site; or
 - b) a shorter period if the site is proven to be geotechnically and geochemically stable and it can be demonstrated to the satisfaction of the administering authority that no release of contaminants from the site will result in environmental harm.
- F2** The Post Closure Management Plan must include the following elements:
 - a) operation and maintenance of:
 - i. wastewater collection and reticulation systems;
 - ii. wastewater treatment systems;
 - iii. the groundwater monitoring network;
 - iv. final cover systems; and
 - v. vegetative cover.
 - b) monitoring of:
 - i. surface water quality;
 - ii. groundwater quality;
 - iii. seepage rates;
 - iv. erosion rates;
 - v. the integrity and effectiveness of final cover systems; and

- vi. the health and resilience of native vegetation cover.

Acid rock drainage and leachate management

- F3** Subject to the release limits defined in Agency Interest: Water, all reasonable and practicable measures must be implemented to prevent hazardous leachate being directly or indirectly released or likely to be released as a result of the activity to any groundwater

F4 Storage and handling of flammable and combustible liquids

All flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of AS 1940 – Storage and Handling of Flammable and Combustible Liquids.

- F5** Spillage of all flammable and combustible liquids must be controlled in a manner that prevents environmental harm.

F6 Storage and handling of chemicals

All chemicals must be contained within an on-site containment system and controlled in a manner that prevents environmental harm and maintained in accordance with the current version of the relevant Australian Standard.

- F7** Spillage of all chemicals must be controlled in a manner that prevents environmental harm.

Infrastructure

- F8** All infrastructure, constructed by or for the environmental authority holder during the licensed activities including water storage structures, must be removed from the site prior to surrender, except where agreed in writing by the post mining land owner / holder.

NOTE: This is not applicable where the landowner / holder is also the environmental authority holder.

Exploration

- F9** Disturbance due to exploration activities in areas not authorised to be mined must be rehabilitated in accordance with provisions detailed in the Code of Environmental Compliance for Exploration and Mineral Development Projects.

Department Interest: Dams

- G1** The holder of this environmental authority must ensure that each dam is designed, constructed, operated and maintained in accordance with accepted engineering standards and is fit for the purpose for which it is intended.
- G2** The hazard category of each dam must be assessed by a suitably qualified and experienced person at least once per year, based on documented evidence sufficient to define or confirm the current nature and extent of environmental consequences for potential failure of that dam. Hazard category is to be determined in accordance with the Department of Mines and Energy's Site Water Management Technical Guideline for Environmental Management of Exploration and Mining in Queensland 1995.
- G3** Dams having a hazard category assessed as significant or high, must be specifically authorised by an environmental authority.
- G4** The condition of dams must be monitored for early signs of loss of structural or hydraulic integrity, based on the advice of a suitably qualified and experienced person. The methods of monitoring and

frequency of monitoring shall be as assessed by that suitably qualified and experienced person, based on the hazard category and particular circumstances of each dam.

- G5** In the event of early signs of loss of structural or hydraulic integrity, the holder of this environmental authority must immediately take action to prevent or minimise any actual or potential environmental harm, and report in writing any findings and actions taken to the administering authority within 28 days of that event.
- G6** The holder of this environmental authority must not abandon any dam but must decommission each dam such that ongoing environmental harm is prevented.
- G7** As a minimum, decommissioning must be conducted such that each dam:
- a) either:
 - i. a stable landform, that no longer contains flowable substances, or
 - ii. approved or authorised under relevant legislation for a beneficial use, or
 - iii. is a void authorised by the administering authority to remain after decommissioning; and
 - b) compliant with the rehabilitation requirements of this environmental authority.

Regulated Dams - Location and basic specifications

- G8** The following are the only regulated dams authorised under this environmental authority, and those dams are to be located within the control points defined in Table 12 (Location of regulated dams).

Table 12 (Location of Regulated dams)

Name of regulated dam	Latitude (GDA94)	Longitude (GDA94)
XXXXXX		

- G9** The following are the only regulated dams authorised under this environmental authority, and those dams are to accord with the basic specifications in Table 13 (Basic specification of regulated dams).

Table 13 (Basic specification of regulated dams)

Name of regulated dam	Maximum surface area (ha)	Maximum volume (ML)	Maximum depth (m)	Purpose of dam
XXX	XXXX	XXXX	XXXX	XXX
XXXX	XXXX	XXXX	XXXX	Containment dam for pit water runoff.
Tailings Storage Facility	XXXX	XXXX	XXXX	Tailings storage and medium term water storage.
XXXX	XXXX	XXXX	XXXX	Medium term water storage and tailings disposal
Flood Protection Levee	XXX	XXX	XXX	XXX

- G10** The following are the only regulated dams authorised under this environmental authority, and those

dams are to accord with the hydraulic specifications in Table 14: Hydraulic performance of regulated dams below.

Table 26: Hydraulic performance of regulated dams

Regulated Dam	Design Storage Allowance	Spillway or Protection Critical Design Event	Mandatory Reporting Level
XXXX	XXXX	XXXX	XXXX
XXXX	XXX	AEP 1 in xxx	XXX
XXXX	XXXX	XXXX	XXXX
Flood Protection Levee	XXXX	XXXX	XXXX

Certification and operation

- G11** Documentation required by the conditions in this schedule must be kept available for inspection by the regulating authority for a period of five (5) years after the conclusion of the environmentally relevant activity in respect of which this environmental authority has been granted.
- G12** The holder of this environmental authority must not commence construction of a regulated dam unless:
- the holder has submitted to the administering authority two copies of a design plan, together with the certification of a suitably qualified and experienced person that the design of the regulated dam will deliver the performance stated in the design plan and that it will be compliant in all respects with this environmental authority, and
 - at least 20 business days has passed since the receipt of those documents, or the administering authority notifies the holder that a design plan and certification, has been received.
- G13** Each regulated dam design plan under this authority must consider the likely outcomes for releases to the environment using estimates of likely contaminant concentrations using data from contact testing, output from modelling on site and modelling for flows in the nearby watercourses,
- G14** Each regulated dam design plan under this authority must include the outcomes from water balance modelling, in accordance with condition **C19**, of at least the five worst case scenarios of wet season storage and discharges. This information must be presented graphically at a monthly and daily timestep and be able to compare the incident rainfall, runoff and environmental releases for all regulated dams.
- G15** When construction or modification of any regulated dam is complete, the holder of this environmental authority must submit to the administering authority two copies of a set of 'as constructed' drawings, together with the certification of a suitably qualified and experienced person that the dam 'as constructed' will deliver the performance stated in the design plan and that it will be compliant in all respects with this environmental authority.
- G16** The holder of this environmental authority must ensure that there is always a current operational plan for each regulated dam, which may form part of other plans required by legislation.
- G17** The operational plan shall at least cover all matters relevant to the operation and maintenance of the regulated dam so that it is compliant in all respects with this environmental authority.
- G18** The holder of this environmental authority must ensure that, where a current operational plan covers

decommissioning and rehabilitation, those operations are consistent with the objectives in any design plan for the dam.

- G19** The holder of this environmental authority must notify the administering authority immediately of the level in any regulated dam reaching the mandatory reporting level (MRL), and confirm in writing within seven (7) days.

Annual inspection and report

- G20** The holder of this environmental authority must arrange for each regulated dam to be inspected annually by a suitably qualified and experienced person, in accordance with the following conditions.
- G21** At each annual inspection, the condition of each regulated dam must be assessed, including the structural, geotechnical and hydraulic adequacy of the dam and the adequacy of the works with respect to dam safety, and any recommended actions conveyed immediately to the holder of this environmental authority.
- G22** The holder of this environmental authority must immediately act upon recommendations arising from an annual inspection on condition and adequacy of a dam.
- G23** At each annual inspection, the adequacy of the available storage against the design storage allowance specified must be assessed and, if a mandatory reporting level is required, it must be determined and marked on each regulated dam.
- G24** A final assessment of adequacy of available storage in each regulated dam must be based on a dam level observed within the month of October, accepted as valid by the suitably qualified and experienced person, and resulting in an estimate of the level in that dam as at **1 November**.
- G25** For each annual inspection, two copies of a report certified by the suitably qualified and experienced person, including any recommended actions to be taken to ensure the integrity of each regulated dam, must be provided to the administering authority by **1 December**.

Flood Protection Levee

- G26** The design plan in accordance with condition **G12** must include:
- drawings describing the location and dimensions of the levee and the mining excavations in the vicinity of the levee, including confirmation the levee meets the specified design requirements in condition **G27**; and
 - a documented procedure for surveillance of the levee and any adjacent mining excavation slopes to detect and report to the administering authority any ground movement that compromises or may compromise the integrity of the levee.
- G27** Design requirements for the levee and adjacent mining excavation include:
- the design level of the levee crest shall be 0.5m above the estimated AEP 1 in 500 flood event for the adjacent watercourses; and
 - mining excavation slopes adjacent to the levee must remain stable and are to be designed with a factor of safety of 1.5 or above based on an accepted stability analysis.
- G28** The flood protection levee authorised under this environmental authority must be constructed and maintained such that:
- it does not result in increased erosion of the bank or bed of any adjacent creek or river;

- b) it does not significantly impact upon riparian or existing remnant vegetation; and
- c) the levee itself will not erode during any flood events up to the AEP 1 in 500 event.

Flood Protection Levee – Inspection and Remedial Works

- G29** The condition of constructed levees including the surface area between the non-creek side of the toe of the levee and the end wall crest of the open-cut mining pit should be monitored for surface cracks and must at a minimum be inspected and assessed by a suitably qualified and experienced person at least once per year between the months of May and October inclusive (i.e. during the 'dry' season and before the onset of the 'wet' season), and at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.
- G30** For each levee annual inspection, two copies of the inspection report, including any recommendations for remedial works, must be provided to the administering inspection within twenty-eight (28) days of the date of inspection.
- G31** Remedial works identified as being required for the flood protection levee during the inspections and assessments conducted under conditions **G29** and **G30**, must be notified in writing to the administering authority within 5 business days of the completion of the inspections, and commenced within twenty-eight (28) days unless otherwise agreed in writing by the administering authority.
- G32** The annual return for this environmental authority shall be accompanied by a report, by a suitably qualified and experienced person, that certifies that the documented procedure for levee inspection has been applied in accordance with the procedure, that there has been no erosion, cracking or vertical or horizontal deformation that has impacted on the integrity of the levee, and that the levee has been maintained in accordance with the certified design plan.

4 Adequacy of the EIS in addressing the TOR

The submitted EIS adequately addressed the TOR. This section of the EIS assessment report discusses aspects of the proposal that require special mention due to unusual circumstances or require further consultation upon completion of the EIS process, or relate to project approvals other than EA MIN100329505.

4.1 Conrock Gully Diversion

The proposed Conrock Gully diversion (Section 1.1 Project Details) will require the construction of a dam to allow water to flow under gravity into the diversion channel. The dam reservoir area currently extends beyond the western boundary of MLA70361.

The proponent is currently in negotiation with the tenure holders, Anglo Coal and Exxaro, for consent to apply for an ML over the dam reservoir area. The consent will include an operational agreement between the proponent and the tenure holders so the dam reservoir area can be potentially underground mined by the current tenure holders at some point in the future.

The DERM accepts the conceptual diversion design for the purposes of completing the EIS process. Subsequent to the completion of the EIS process the draft EA and ML tenure will be released for public notification according to the legislative requirements of the EP Act and *Mineral Resources Act 1989* (MR Act) and progress through the Land Court process, prior to final issue. However, the Department of Employment, Economic Development and Innovation (DEEDI), formerly the Department of Mines and Energy, will not be recommending grant of the ML tenure until receipt of MLAs from the proponent over the entire mining project, including the Conrock Gully diversion dam reservoir area. DEEDI will also need to receive a copy of the operational agreement between the proponent and the current tenure holders of the dam reservoir area to assess compliance against the legislative requirements of the MR Act.

The above DEEDI requirements have the potential to cause issues with streamlining the public notification process for the draft EA and MLAs (i.e. the MLA over the dam reservoir area will require separate public notification if it has not been received by DEEDI prior to release of the draft EA and other project MLAs for public notification).

The timing of public notification can be determined by the release date of the draft EA. Consequently, following completion of the EIS process for the IIPP, the DERM can negotiate with the proponent about the agreed release date for the draft EA and extend the refusal period under section 207 of the EP Act, if required.

4.2 Dragline

The proponent proposes to replace the truck and shovel fleet with a dragline at the current Isaac Plains coal mine as part of the expansion activities. The eastern outskirts of the Moranbah township are approximately 4km from the active mining pits at the existing Isaac Plains coal mine. As mining progresses further east the distance of active mining to the Moranbah township will increase. At the end of mine life at the current Isaac Plains coal mine in approximately 2016 the dragline is proposed to be walked across a low level crossing of the Isaac River to commence operating in the expansion area located some 10-12km away from the Moranbah township. Many public submissions raised concerns with the potential for increased air, noise and aesthetic impacts from introducing a dragline at the current operation due to its proximity to the Moranbah township.

Dust deposition modelling in Chapter 8 of the EIS produced a comparative result of less than 27mg/m²/day (including ambient levels) for either truck and shovel or dragline operations on the Moranbah township. This is well below the DERM dust deposition limit of 120mg/m²/day. The predicted PM₁₀ dust concentration levels (including ambient levels) at Moranbah were within the limits of the Environmental Protection (Air) Policy 2008 (the fifth highest predicted 24-hour PM₁₀ concentration was 41µg/m³). This is below the DERM PM₁₀ dust concentration human health and wellbeing objective of 50µg/m³ (24-hour average, maximum allowable exceedences 5 days a year).

Air quality control measures in the EM plan include ensuring that dragline operators are properly trained to reduce drop heights from the dragline bucket to minimise dust generation. The proponent has also committed in the EM plan to installing dust samplers to monitor PM₁₀ concentrations between the current Isaac Plains coal mine and the Moranbah township in real time with results linked via telemetry to the site communications system so that immediate remediation measures can be implemented to address dust levels approaching the specified limits. The proponent has also committed to conducting field verification of dust emissions from the dragline bucket during mining operations for comparison with the modelled results and EA limits. If dust emissions are found to be excessive, control strategies are proposed to be developed in conjunction with the administering authority.

Noise levels at the current operation are not expected to significantly increase from replacing a truck and shovel fleet with a dragline because the dragline will be operating in-pit which will buffer noise transfer to surrounding areas. Spoil dumps and/or specifically constructed earthen mounds will be used to reduce noise emissions from the project, if required. The proponent is also committed to conducting ongoing training of dragline operators to ensure that noise from dragline sheaves and rope sockets (which cannot be noise dampened due to maintenance requirements) is minimised and the dragline is operated in the quietest way possible. Skilled dragline operation, in combination with other noise mitigation measures (including spoil dump and/or constructed earthen barriers, if required) will minimise noise generation and transfer to surrounding areas, including the Moranbah township and other noise sensitive areas.

The proponent also intends implementing a shut down procedure in the event of significant and sustained adverse meteorological conditions with the specific purpose of protecting noise and air quality amenity for residents within Moranbah and at other sensitive receptors (Refer to Section 5).

Visual impacts of introducing a dragline at the current operation will be most evident during the latter part of its twelve month construction phase. During operation the dragline will generally be obscured from view within the active mining pit. Vegetation and earthen screens will also be used to improve visual amenity at surrounding residential locations.

4.3 Transport

4.3.1 State Controlled Roads

The proponent has applied for a mining lease for infrastructure over the Peak Downs Highway in order to construct an underpass for access to the proposed expansion area. Access to the expansion area prior to the construction of the Peak Downs Highway underpass will be via Winchester Road.

Construction of the proposed Peak Downs Highway underpass would be of a significant nature and is expected to take in the order of nine months to complete. From an operational and safety perspective (i.e. construction workforce and passing traffic) it would be impractical to accommodate traffic along the existing Peak Downs Highway alignment during the construction of the underpass. Therefore, the draft EIS proposes a side-track to divert highway traffic around the underpass construction site. The side-track will be constructed to accommodate two-way traffic. The road works associated with the construction of the Peak Downs Highway underpass include the following:

- Construction of an underpass of the Peak Downs Highway;
- Construction of an underpass side-track;
- Installation of category V5 lighting at the intersection of the access road to the Peak Downs Highway; and
- Installation of retro-reflective raised pavement markers.

Queensland Department of Transport and Main Roads (Main Roads) is concerned about the potential impacts of the Peak Downs Highway underpass construction on the safe operation of the State controlled road network. Main Roads is also concerned about the impact of construction and operational traffic on pavement life and the need for increased maintenance on the State-controlled road network. To ensure that all regulatory approvals for the underpass construction are obtained from Main Roads and the safe and efficient operation of the State-controlled road network is maintained, the proponent should work in close consultation with Main Roads' district representatives to achieve the following recommendations:

1. *Prior to construction of any works within or under the surface of the State-controlled road reserve the proponent must obtain approval from the Queensland Department of Transport and Main Roads under sections 33 and 50 of the Transport Infrastructure Act 1994 (TIA). Proposed works must comply with the Main Roads' Road Planning Design Manual. The proponent must also ensure that the construction and operation of the underpass and ancillary activities, and the mine operations do not interfere with the safe operation of the Peak Downs Highway.*
2. *If applicable, the proponent is to enter into an agreement for compensation with Department of Transport and Main Roads for the proposed mining lease over State-controlled road reserves as required by section 50 of the TIA.*
3. *To maintain road safety and efficiency, the existing channelised intersection access to the Peak Downs Highway shall continue to remain the only point of access to the Peak Downs Highway during the construction and operational phases of the IIPP.*
4. *To maintain pavement life of the State-controlled road network, the proponent shall contribute to accelerated increase in road maintenance costs for the upkeep of the 26km of the Peak Downs Highway as per the recommendations in Section 14.4.5 of the supplementary report.*

4.3.2 Rail

Product coal is proposed to continue to be transported via the Goonyella rail line from the existing Isaac Plains coal mine to the Dalrymple Bay coal terminal (DBCT) near Mackay. The proposed IIPP would increase ROM coal production from 1.9Mt/y to 4Mt/y for 15 years. This would see IIPP's contribution to coal dust emissions on the Goonyella rail system increase from approximately 2.2% to 4.6% per annum, or by 110% in absolute terms. The calculated increase is based on total coal throughput at Hay Point and Dalrymple Bay coal terminals of 86.3Mtpa in 2006/07.

The DBCT is currently being expanded from 68 to 85Mt/y throughput capacity, with completion scheduled for April 2009. Hay Point coal terminal at Mackay also services the Goonyella rail system and has a current capacity of 44Mt/y. Therefore, by April 2009 nominal coal terminal throughput capacity servicing the Goonyella rail system will be approximately 129Mt/y.

Improved management of coal dust across the whole coal transport corridor is a high priority for the Queensland Government. Consequently, at the request of the former EPA, Queensland Rail Limited (QR) has recently completed an *Environmental Evaluation of the impact of coal dust from trains in Central Queensland*. The Environmental Evaluation report recommended a number of dust mitigation measures including:

- Spraying chemical dust suppressants on loaded coal wagons;
- Improving coal loading techniques at coal mines (including over-load controls and minimising parasitic coal on sills and bogies during loading); and
- Improved load profiling to create a more streamlined and consistent surface of coal in each wagon.

The former EPA accepted the Environmental Evaluation report as meeting its requirements and requested that QR prepare a Transitional Environmental Program for implementing the recommendations of the report. The Transitional Environmental Program report was completed and submitted to the former EPA in August 2008.

To ensure that all relevant coal dust mitigation measures are implemented at the IIPP, the proponent should work in close consultation with QR's Network Access Division to determine the likely requirements for new coal-loading facilities, load controls and spray-on coal dust suppressants as a result of the implementation of the final Transitional Environmental Program. Enquiries regarding the timing and implementation of the TEP should be directed to:

Graham Stockwell
Project Manager
Coal Loss Management Project
Telephone: (07) 3235 5620
E-mail: graham.stockwell@qr.com.au

The implementation of additional measures to reduce coal dust emissions from trains servicing the IIPP should be included in the list of Control Strategies in the relevant section of the Environmental Management Plan.

4.4 Waterway barrier works approval under the Fisheries Act 1994

The former Department of Primary Industries and Fisheries (DPIF) advised the former EPA that the EIS adequately addressed the issues related to the need for a waterway barrier works approval under the *Fisheries Act 1994* for the low level crossing of the Isaac River. DPIF did not recommend conditions for the approval at this stage, but advised that a detailed assessment of the key fisheries issues associated with the proposed development will be undertaken when the proponent applies for the waterway barrier works approval.

5 Adequacy of the EM plan for the project

A draft EM plan was included with the draft EIS that was released for public notification. The draft EM plan was subsequently amended in the supplementary and addendum reports and again in the amalgamated EIS received by the administering authority on 27 February 2009. However, it does not yet contain the recommended EA conditions outlined above, or the environmental protection commitments and additional information requirements discussed below and for the purposes of the statutory requirements cannot be considered adequate.

The following outstanding issues in the EM plan have been identified and must be addressed:

20.5.3 Environmental Protection Objectives and Control Strategies – Air Quality & 20.7.3 Environmental Protection Objectives and Control Strategies – Noise & Vibration

Section 8.6 of the EIS and section 20.5.3 of the EM plan includes, amongst other things, a commitment to develop and implement a site shut-down procedure in the event of significant and sustained adverse meteorological conditions with the specific purpose of protecting air quality amenity for residents at Moranbah and other dust sensitive receptors. Section 9.7 of the EIS and section 20.7.3 of the EM plan includes a similar commitment to protect the acoustic amenity of noise sensitive receptors, including Moranbah residents. The procedure is proposed to be implemented at the commencement of mining activities in the expansion area on the southern floodplain of the Isaac River.

While the DERM supports the development and implementation of a site shut-down procedure, further information is required in the EM plan about the details of the shut-down procedure to assist the DERM when

drafting EA conditions. Specifically, the proponent should provide information to define "significant and sustained adverse meteorological conditions". This should include a review of the long-term historical meteorological conditions for the area to identify significant events and assess the significance of the events in light of available air quality monitoring data. It is understood that prior to commencing existing operations Isaac Plains conducted an ambient air quality survey in 2004, and since late 2005 in conjunction with Broadlea and Carborough Downs mines have been undertaking dust deposition monitoring at 22 locations within the existing mine and surrounding area. In terms of monitoring the acoustic environment, prior to project commencement noise surveys were conducted in 2004 and 2005 at the homestead. A survey of the existing ambient noise levels was also conducted at the homestead in May 2006. These are significant noise and air quality datasets upon which to draw when assessing which meteorological conditions may contribute to elevated emission levels so that "significant and sustained meteorological conditions" may be defined for the purposes of developing a site shut-down procedure.

The above assessment should be used to develop a draft site shut-down procedure which should also be included in a revised EM plan for the purposes of assisting the DERM with drafting EA conditions.

Also, the EM plan should be amended to commit to implementing the site shut-down procedure upon introduction of the dragline at the existing operation. The existing operation is much closer to the Moranbah township than the expansion area and dust and noise emissions from the existing operation have a far greater potential to impact on the health, well-being and aesthetic amenity of Moranbah residents.

20.9.3 Environmental Protection Objectives and Control Strategies – Land

Section 19.1.4 of the EIS and section 20.9.3 of the EM plan describes, amongst other things, the post-mining landform drainage system. The proponent proposes an overburden emplacement in the Nogoa River floodplain protected from flooding by a PMF levee. The landform is proposed to be externally drained with runoff directed to a series of 1-in-20-year ARI (Q20) contour drains. Overburden runoff collecting around the perimeter of the final landform in the 20m wide corridor between the toe of the overburden and the inside of the PMF levee is proposed to be collected in a 10m wide table drain. Runoff is then proposed to be conveyed to the surrounding floodplain environment by a series of culverts fitted with floodgates installed underneath the PMF levee.

The DERM does not accept some of the concept in the overall post-mining landform and PMF levee design. Sediment laden run-off from the overburden emplacement will flow into the table drain, and under average flow conditions sediment will drop out of suspension and fill the table drain. The deposition of sediment will eventually block the culverts which are diverting run-off water underneath the PMF levee to the surrounding floodplain environment. The proposed arrangement of table drains on the inside of the PMF levee discharging through culvert pipes and floodgates may be manageable during the operating life of the project. However, the proposal to leave the drain, culvert and floodgate arrangement in place after closure, as a long term water management system is not acceptable. This proposal would create a substantial and permanent maintenance requirement. The DERM's expectation of rehabilitated mining projects is that they will have a life of at least 150 years and be stable and self-sustaining without requiring major maintenance or other interventions. The post-mining drain, culvert and floodgate arrangement proposed in Section 19.1.4 and Figures 19-1 to 19-5 of the EIS does not, in the Department's view, meet that requirement.

The drainage arrangements can be simplified, and the longevity of the PMF levees increased by integrating the overburden emplacement into the PMF levee and directing rainfall run-off from the overburden emplacement via durable engineered channels directly over the top of the PMF levee to the surrounding floodplain environment. This could be achieved by reconfiguring the spoil emplacement to a higher elevation on both the Conrock Gully and Isaac River sides. Run-off would be discharged by gravity flow through a series of lined channels at appropriate slopes, and at levels and in positions to minimise erosion. In relation to Figure 19-1 of the EIS the above arrangement could be achieved on the Isaac River side of the overburden emplacement by raising uniformly the level of the eastward draining spoil under the blue label "0.5%" directly over the top of the PMF levee. A more elevated spoil emplacement would have the benefit of buttressing the PMF levee against the effects of erosion in the longer term.

Figure 19-5 of the EIS shows a PMF levee with a considerably narrow crest width of just 5m. Unless rock protection and filters were used on both the inside and outside faces of the proposed levee over its full length, a crest width of 5m would not normally be sufficient to withstand the erosive forces and maintain structural integrity for 150 years.

On the Conrock Gully side of the overburden emplacement direct discharge to the external floodplain can be achieved by moving the PMF levee closer to the spoil in order to achieve integration with the slope of the spoil dump emplacement.

The alternative proposal outlined above would require sediment dams on the outside of the PMF levee during the initial years following project closure. This would be necessary to manage sediment in run-off before rehabilitation and revegetation of the spoil dump emplacement becomes effective in controlling sediment movement on the surface of the emplacement.

The contour plan of the spoil emplacement in Figure 19-1 of the EIS should also show the positions of drainage channels carrying run-off from the top of the spoil emplacement down into the surrounding floodplain environment. Figure 19-1 shows external slopes of 1:6 but no details about drainage paths, or typical drawings or cross-sections of the main channels discharging water down the external slopes. The DERM requires this information to understand the likely success of the drainage plan for the overburden emplacement. This information will be particularly relevant for a drainage plan which channels water down the emplacement and across the top of the PMF levee to the surrounding floodplain environment. For a target post-mining landform lifespan of 150 years the Department's expectation would be for the main drainage channels to be armoured or lined and be able to carry flows safely and without sustaining flow damage.

The proponent should reconsider the current post-mining landform design and submit in an amended EM plan an alternative design which addresses the issues raised above. Also, the proponent should outline who will be responsible for the ongoing maintenance of the post-mining landform.

Content requirements of EM plan

The recommended changes to the EM plan outlined in sections 4 & 5 and the recommended conditions and associated auditable commitments from the recommended conditions outlined in section 3 of this EIS assessment report should be fully integrated into the EM plan. The revised EM plan, which must meet the content requirements of s203 of the EP Act, must be resubmitted for assessment before the decision under s207 is made on whether to allow the application to proceed to the draft EA stage.

6 Suitability of the project

The DERM has considered the final TOR, the submitted EIS, all submissions on the submitted EIS, and the standard criteria. The submitted EIS and supplementary information have not identified impacts of sufficient magnitude to prevent the project from proceeding. Therefore, the project is considered suitable to proceed to the next stage of the approval process. However, the recommendations of this EIS assessment report should be fully implemented.

Disclaimer:

While this document has been prepared with care it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Department of Environment and Resource Management should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

Approved by

sch4p3(3) Prejudice the protection of an individuals right to privacy

Signature

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BOWEN CENTRAL COAL MANAGEMENT PTY LTD

ENVIRONMENTAL MANAGEMENT OVERVIEW STRATEGY (EMOS)

November 2005

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1 INTRODUCTION

Matrix+ Consulting was engaged by Bowen Central Coal Management Pty Ltd (BCC) to prepare a draft Environmental Management Overview Strategy (EMOS) for the proposed Isaac Plains Project. The Isaac Plains Project is a proposed open-cut mine located approximately 7 km north east of Moranbah on EPC755.

An EMOS is a strategic environmental management document for mining activities on non-standard mining leases which describes industry acceptable impacts and environmental management strategies designed to meet agreed performance criteria.

The purpose of the EMOS is to:

1. provide information to the EPA that supports BCC's application for an Environmental Authority for a non-standard mining activity; and
2. propose environmental protection commitments to assist the EPA with preparing the draft Environmental Authority for the mine.

The content requirements for an EMOS are outlined under Section 203 of the *Environmental Protection Act 1994*. In order for the EPA to assess the application, the Isaac Plains EMOS includes:

- a description of the Mine and surrounding environment;
- the identification of relevant environmental values likely to be affected by the mining activities;
- a statement of the potential adverse and beneficial impacts on environmental values;
- a statement of the environmental protection commitments proposed to protect and enhance the environmental values in terms of:
 - environmental protection objectives, standards and measurable indicators including, for example, objectives for progressive and final rehabilitation, and management of contaminated land; and
 - control strategies to ensure the environmental protection objectives are achieved.

This Draft EMOS was prepared in accordance with the Environmental Protection Agency's (EPA) Guideline 8 *Preparing an environmental management overview strategy (EMOS) for non-standard mining projects* and the *Environmental Protection Act 1994*. It should be noted that draft conditions for the Environmental Authority have been proposed within this document and that the final conditions of the Environmental Authority granted by the EPA may differ from that proposed as a result of EPA's assessment. The conditions of the granted Environmental Authority take precedence over those proposed in this EMOS.

2 ISAAC PLAINS PROJECT DESCRIPTION

2.1 OWNERSHIP

The Isaac Plains Project is located within EPC755. Aquila Coal Pty Ltd, a subsidiary of Aquila Resource, was granted EPC755 on 10 April 2002 for a period of three years. Aquila Coal Pty Ltd subsequently entered into a JV Agreement on 27 January 2004 with AMCI Australia Pty Ltd for the management of Aquila's EPCs in Queensland. The EPC was subsequently transferred to Aquila Coal Pty Ltd (50%) and Bowen Central Coal Pty Ltd (50%) on 11 October 2004.

A Mineral Development Lease application, that covers the footprint of the Isaac Plains Project, was lodged by the applicant on 23 December 2004.

2.2 PROJECT LOCATION

The Isaac Plains Project is a proposed open-cut Mining Lease situated within EPC 755. The project is located approximately 7 km east of Moranbah in Central Queensland. The southern extent of the proposed open-cut pit is approximately 2 km from the Peak Downs Highway.

A locality plan showing the area of interest for the proposed Mining Lease is enclosed as **Figure 2-1**.

The proposed pit is approximately 5 km to the northeast of the Isaac River and strikes parallel to its course. There are no areas designated as National Parks or State Forest on the proposed Mining Lease or within the adjacent area. The Smoky Creek watercourse flows in a NE/SW direction through the proposed mining lease. A smaller tributary of the Isaac, referred to as the 'Unnamed Watercourse', flows through the southern portion of the proposed mining lease.

2.3 MINING TENURE

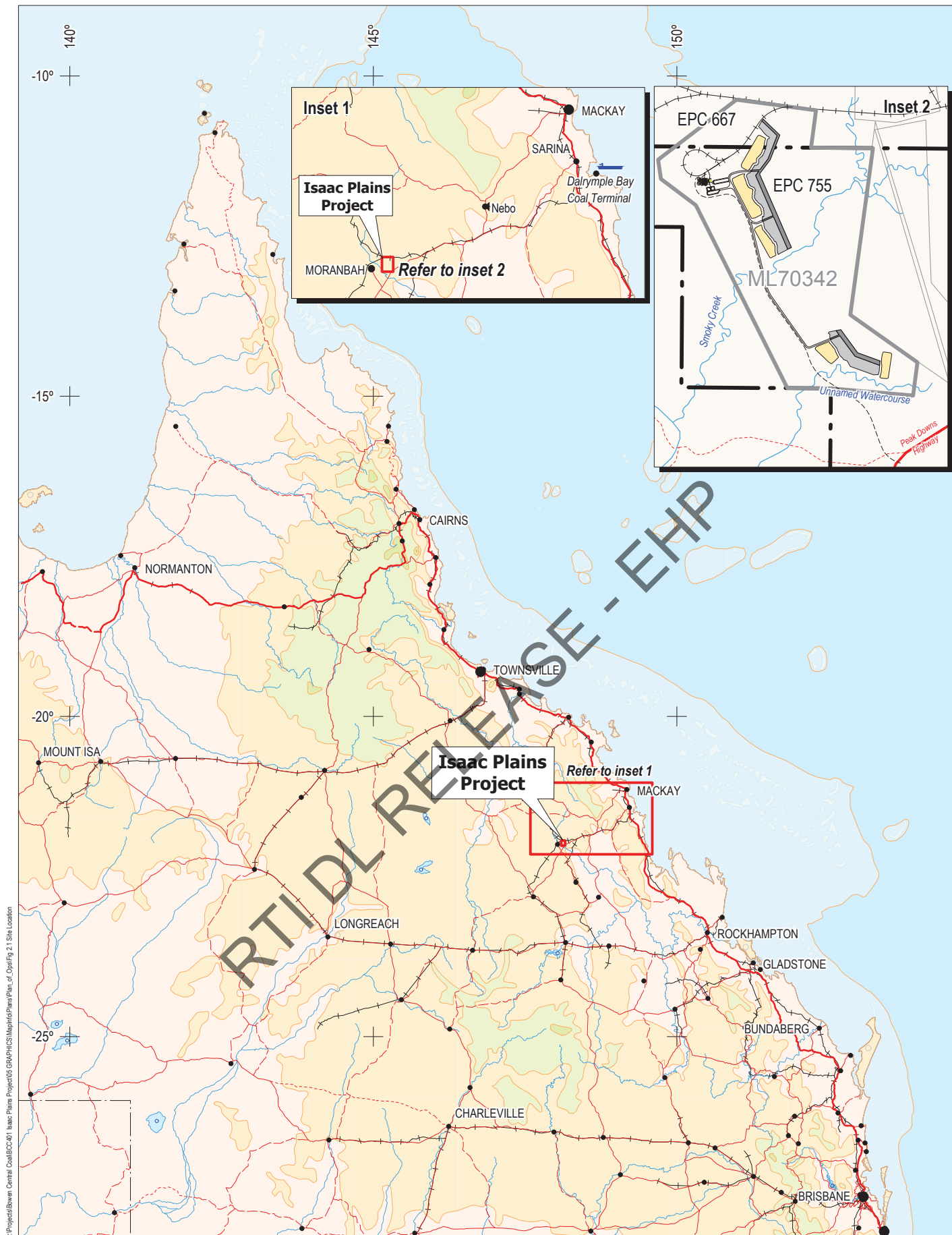
The area of interest is situated on Lot Number 3 GV 252, freehold title, Lot No 5 GV 132, freehold title, Lot No 2 RP 904445 freehold title and Lot No 4 CP903281 leasehold title as illustrated in **Figure 2-2**.

The proposed mining lease area within EPC 755 is bound by Mineral Development Licence (MDL) 135 in the east and MDL 273 to the west. Exploration Permit (EPC) 667 lies immediately to the north while both MDL 273 and EPC 755 are adjacent to the south. The area of interest is underlain by Petroleum Lease (PL) 191.

2.4 RELEVANT STAKEHOLDERS

Relevant stakeholders that have been consulted regarding the project to date include:

- Landholders underlying the proposed mining lease, in particular homesteads;
- Frank Budby, applicant/representative of Barada Barna Kabalbara & Yetimarla People No. 3 and No. 4;
- Environmental Protection Agency;
- Department of Natural Resources and Mines; and
- Belyando Shire Council.



Legend

-  City
 Town
 Road
 Track
 Railway line

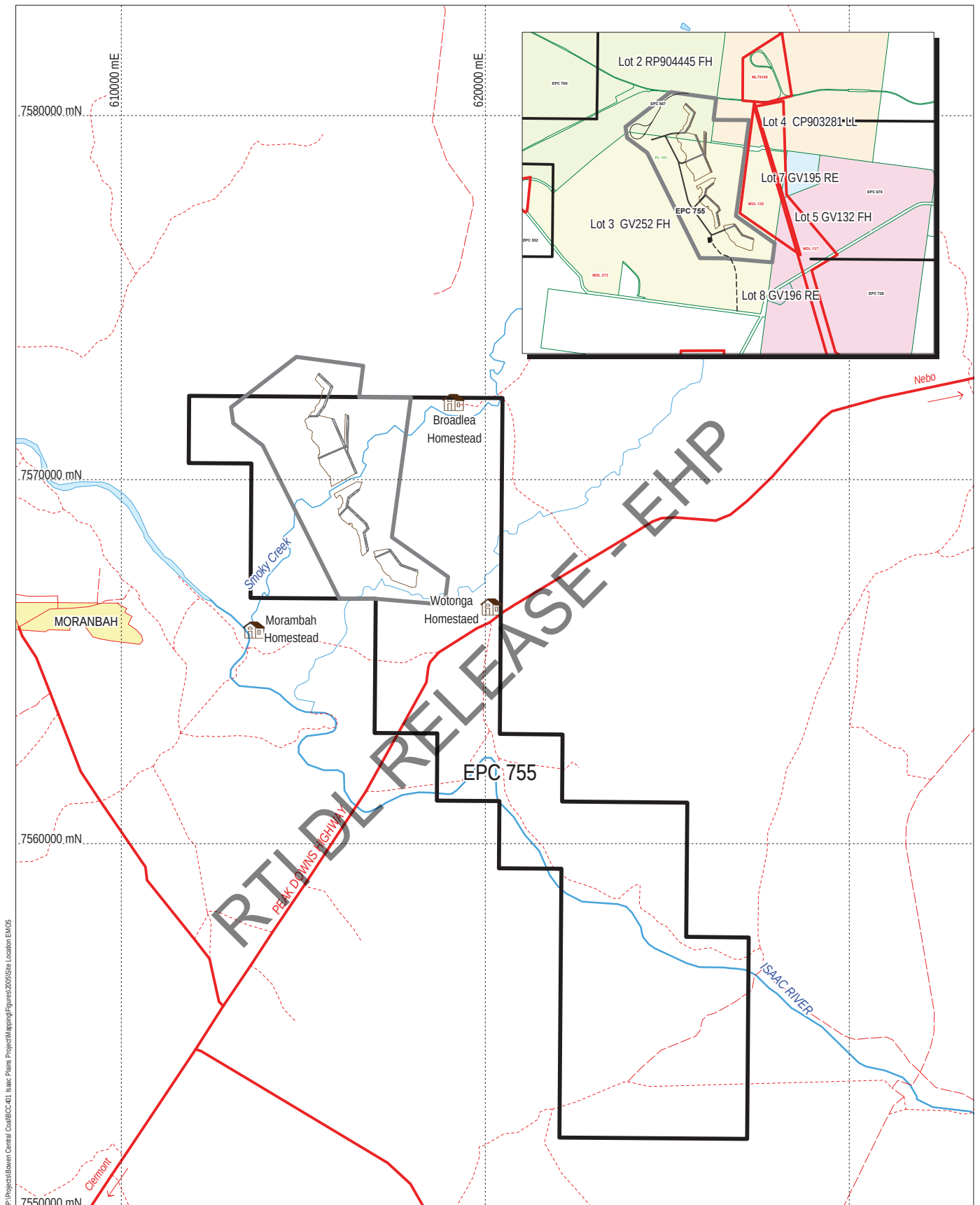
Bowen Central Coal Management Pty Ltd
Isaac Plains Project
Site Location



A horizontal scale bar with a black segment from 0 to 250 and a white segment from 250 to 500. The word 'kilometres' is centered below the bar.

FIGURE 2-1

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- Legend**
- Drainage
 - Highway / Road
 - Track
 - Pit area
 - EPC 755 boundary

**Bowen Central Coal Management Pty Ltd
Isaac Plains Project
Tenements and Tenure**

Datum: ADG 84
Projection: TM, zone 55

0 5
kilometres

FIGURE 2-2

3 MINING ACTIVITIES

3.1 PROJECT HISTORY

Prior to Aquila Coal Pty Ltd being granted the current EPC755, the area had been explored in a number of phases of activity, summarised as follows:

- The earliest recorded exploration in the area was carried out by the Utah Development Company Pty Ltd in the 1960's. Although coal was intersected at shallow depth, it was not investigated further. Some six (6) holes transacted the Isaac Plain Project area, but did not intersect the Leichhardt seam due to a maximum drill depth of 60 metres, and spacing between holes.
- Thiess Peabody Mitsui Pty Ltd conducted traverses in the area from the mid-1960's into the 1970's.
- Queensland Mines Department in the 1970's drilled some regional exploration holes in the south of EPC755, outside the Isaac Plains Project area.
- Iscor Australia Pty Ltd as the holder of EPC602 drilled six holes in the southern part of the area, all of which targeted the deeper Moranbah Measures. The potential of the Rangal and Fort Cooper Measures was not investigated although coal was intersected at very shallow depths in one of these holes. These holes were south of the Isaac plains project area.
- MGC Resources Australia Pty Ltd conducted 2D dynamite seismic surveys across the area, and followed this up with some gas/oil exploration holes. Moranbah 1S was completed in November 1993 to a depth of 636 metres. This hole is not within the Isaac Plains Project area, but was spudded in the Fort Cooper Measures some 1.5 km south west of the Project area.

Aquila Coal Pty Ltd drilled 26 holes in EPC755 between September 2002 and April 2003. None of these holes were in the Isaac Plains Project area. In 2003 five (5) chip drill holes were completed in EPC755 by Nebo Central Coal Pty Ltd, the holder of EPC667 immediately north of EPC755. These indicated that there was a coalescing of the Leichhardt and Leichhardt Lower working section (LHL) split and the main Leichhardt seam in EPC755. Two of these holes (BC095 and 096) were in the Isaac Plains Project area.

From April 2004 to September 2004, BCC drilled some three hundred and sixteen (316) drill holes in EPC755 with 298 within the Isaac Plains Project area. These included rotary chip drilling, 100mm core drilling, continuous 62mm diamond coring, and LOX reverse circulation drilling using modern coal exploration drill rigs from various contractors (Depco Drilling Pty Ltd, Phoenix Drilling Pty Ltd, and IESA Pty Ltd). Some 23,000 metres of drilling was completed with 301 metres of 100mm coring and 281 metres of 62mm coring for later geotechnical evaluation. The drill program initially consisted of chip holes to determine the lateral extent of the potential resource and some initial coring to test for coal quality.

Following the initial program, a decision was made to close the drill spacing to 250 metre between chip holes and 500m between cored holes. At the completion of this resource program, there was a short program to drill test the line of oxidation (LOX). This involved drilling shallow normally dry holes close to the zone where the target coal seam was oxidized or weathered. These lines were spaced between the 250 m lines (at approximately 125 m), and holes were also drilled along the existing drill lines.

3.2 RESERVES AND MINE LIFE

Resource modelling based on the exploration program has estimated resources in the Isaac Plains Deposit area to be 18 Mt, based on a strip ratio of 15 (bcm/t). The coal is suitable for coking and thermal coal.

3.3 MINING OPERATIONS

The Mine will be developed as an open cut coal mine producing thermal and coking coal. The coal will be crushed, sized and washed on site, before being railed to Dalrymple Bay Coal Terminal for export. Construction of the mine is anticipated in November 2005 with export of coal during mid 2006. Approximately 1.6 Mtpa of coal will be exported from the site.

The coal mining resources within the proposed mining lease are estimated at 18 Mt to a strip ratio of up to 15:1 (bcm/t). It is envisaged that mining will be undertaken at a rate of 1.9 Mtpa. Major components of the Mine are shown in the conceptual mine layout **Figure 3-1** and include:

- Three open cut pits;
- Coal handling and preparation plant (CHPP) area including crushing facility, coal stockpile pad and temporary reject stockpiles;
- A Mine Infrastructure Area which includes office buildings, workshops, controlled access gate and sewage treatment plant;
- Water management structures; and
- Rail loop.

The resource consists of dipping coal seams from a depth of 10-15 m in the west to 50-70 m in the east. The shallow depth of the deposit makes it suitable for truck, excavator and dozer operations. Separate pre-strip operations will be undertaken in each of the three pits at any one time.

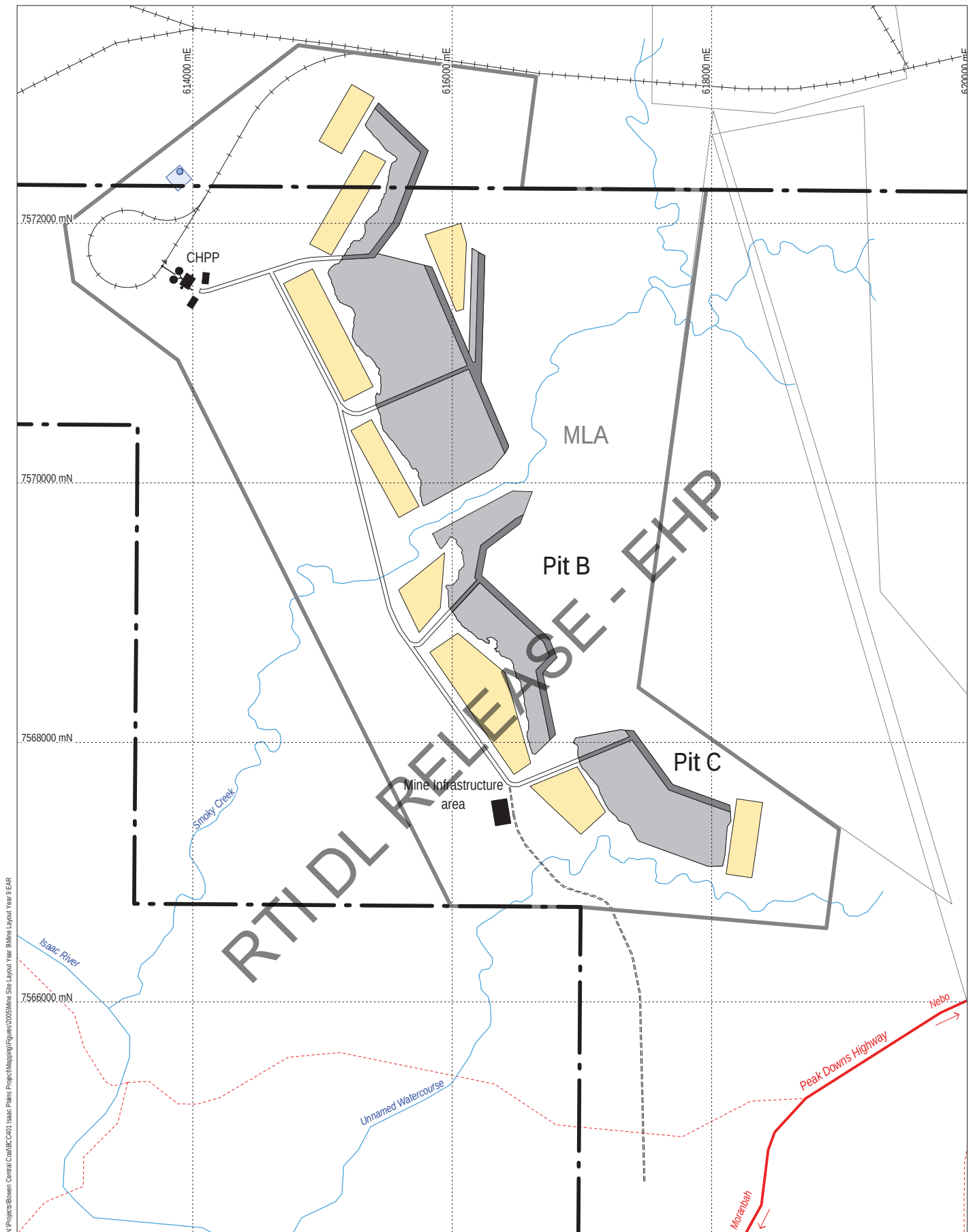
Overburden will require drilling and blasting prior to removal by excavator.

The coal will require washing in the CHPP for ash and variability in coal quality across the deposit. The CHPP will not require a tailings dam as the thickener underflow will be dewatered in belt press filters which squeeze extra water from the tailings for immediate re-use in the plant. Under this process the tailings are dewatered to around 70% solids (30% moisture) and will be disposed with the other rejects (coarse & fines) without the need for pumping to a tailings dam.

The pit layout is dominated by the need to maintain flows through Smoky Creek. Both Smoky Creek and the Unnamed Watercourse will be protected by flood levees during mining (approximately 2 metres in height). The Mine is designed on the basis of central ramps.

The mine will operate on a continuous basis of 24 hours/day for 364 days/year.

At an annual extraction rate of 1.9 Mtpa, the mine life is estimated as 9 years. Coal will be extracted from three separate pits referred to as Pit A, Pit B and Pit C, as illustrated in **Figure 3-1**. Coal will be extracted using conventional open-cut mining techniques, using excavators and trucks. Highwall mining will also occur upon completion of the economic removal of coal using conventional truck and shovel method.



RTI/DL RELEASE - EHP



Legend

- | | | | |
|--|------------------|--|----------------|
| | EPC 755 boundary | | Boxcut |
| | MLA boundary | | Pit |
| | Access road | | Internal spoil |
| | Haul road | | |
| | Infrastructure | | |

**Bowen Central Coal Management Pty Ltd
Isaac Plains Project**

Conceptual Mine Site Layout Year 9

Datum: ADG 84
Projection: TM, zone 55

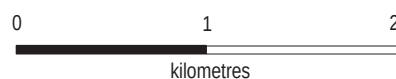


FIGURE 3-1

Stages of development are summarised in **Table 3-1** below.

Table 3-1 Mine Development Schedule

Infrastructure	Yr 0-1	Yr 1-5	Yr 5-9
Pit A			
1. Clear, strip to stockpile topsoil for Pit A	✓		
2. Boxcut Pit A	✓		
3. Mine Pit A and haul to run of mine for processing in a coal handling and preparation plant	✓		
4. Continue to progressively clear, strip and stockpile topsoil for Pit A, 3-4 years in advance of mining		✓	
5. Progressive in-pit disposal and rehabilitation of overburden material		✓	
6. Progressively mine Pit A and transport coal to ROM and CHPP		✓	
7. Continue steps 4 to 6 until target strip ratio is reached			✓
8. Highwall mining			✓
9. Commence final rehabilitation areas			✓
Pit B & C			
10. Clear, strip to stockpile topsoil		✓	
11. Boxcut		✓	
12. Mine and haul to run of mine for processing in a coal handling and preparation plant		✓	
13. Continue to progressively clear, strip and stockpile topsoil, 3-4 years in advance of mining			✓
14. Progressive in-pit disposal and rehabilitation of overburden material			✓
15. Progressively mine and transport coal to ROM and CHPP			✓
16. Continue steps 4 to 6 until target strip ratio is reached			✓
17. Highwall mining			✓
18. Commence final rehabilitation areas			

3.4 COAL PROCESSING AND HANDLING ACTIVITIES

The coal handling and preparation plant (CHPP) to be used for the Isaac Plains Project will not require a tailings dam.

Normally, the thickener underflow (30% solids) would be pumped to a tailings dam where settling occurs and the decant water is pumped back to tanks for use in the plant. Under the proposed process the thickener underflow will be further dewatered in belt press filters which squeeze extra water from the tailings for immediate re-use in the plant. Under this process the tailings are dewatered to around 70% solids (30% moisture) and can be disposed with the other reject (coarse & fines) without the need for pumping to a tailings dam. Also as water is scarce, the proposed process avoids water loss via evaporation in the tailings dam.

Further details of the CHPP are provided below:

1. Run of mine coal receival rate at nominally <1000 mm onto a ROM stockpile area;
2. Loading by Front End Loader (FEL) into small hopper;
3. Plant feed rate nominally 500 t/h (ar);
4. Triple roll crusher to crush the ROM coal to pass nominally 50 mm;
5. Washing of the + 1.4 mm fraction in a primary dense medium cyclone (cut-point density 1.35);
6. Sizing of the primary DMC clean fraction at 16 mm, with -16 mm to coking product, +16 mm to secondary product;

7. Washing of the primary DMC reject fraction in a secondary dense medium cyclone (cut-point density 1.60);
8. Washing of the -1.4+0.25 mm raw coal in a teetered bed separator circuit to produce a coking product;
9. Washing of the -0.25 mm raw coal in a flotation circuit to produce a coking product;
10. The plant will operate in the above mode 50% of the time. For remaining 50% of time, operation will be single product mode to produce a pulverised coal injection (PCI) product only;
11. Dewatering of tailings in a thickener;
12. Further dewatering of thickened tailings (underflow from thickener-normally 35% solids) in belt press filters to recover maximum water and limit the amount of fresh make-up water required. Dewatered tailings will be at 70% solids;
13. Conveying of the rejects to a stockpile from where it will be removed by front end loader and truck; and
14. Conveying of the coking and secondary products separately to stacking conveyors, to stockpile into separate product stockpiles.

Dewatered tailings will be disposed with coal rejects within in-pit spoil disposal areas.

3.5 INFRASTRUCTURE

The Coal Handling and Preparation Plant (CHPP) area contains the ROM area and coal handling facilities, rail loop and load-out and stockpile pads. The Mine Infrastructure Area (MIA) contains the mine offices, workshops and carparks (refer Conceptual Mine Layouts, **Figure 3-1**). Other ancillary infrastructure requirements include communication facilities, water truck fill station, sewage treatment plant, water management dams, fuel and lubricant facility, hardstand and laydown areas.

Power to the site will be via the Ergon Energy network. Three existing power lines are located within an easement on the western boundary of the mining lease area. Ergon Energy is currently investigating the design for the provision of power supply to the mining lease.

3.6 TRANSPORT ACTIVITIES

3.6.1 Road

The main access to the Mine will be from the Peak Downs Highway to the south. The access road will run along the western side of the boxcut and active pits within the proposed mining lease (refer **Figure 3-1**).

3.6.2 Rail

Coal will be reclaimed from the product stockpiles using in-ground feeders to the train loading bin on the rail loop (refer **Figure 3-1**) for railing to Dalrymple Bay, south of Mackay via the Goonyella to Hay Point rail line. Train movements are estimated at 1 movement every second day.

3.7 ENVIRONMENTALLY RELEVANT ACTIVITIES

Based on the activities proposed for the Isaac Plains Project, non-mining environmentally relevant activities (ERA's) that may be triggered are summarised in **Table 3-1** below.

Table 3-2 Non-mining Environmentally Relevant Activities

ERA	Description	Level	Annual Fee
7(b)	Chemical storage – 1,000 m ³ or more	1	\$1,740
11(b)	Petroleum product storage – 500,000 L or more	1	\$1,740
15(b)	Sewage treatment works – less than 1500 equivalent persons	1	\$1,500
28	Motor vehicle workshop	1	\$500
62	Concrete batching	1	\$650
84(b)	Regulated waste storage	1	\$2,000

Extraction of rock or other material and screening for the purpose of infrastructure construction at Isaac Plains (eg roads, dams etc) will be undertaken within the proposed mining lease. If required, additional material will be imported from an external source that is appropriately licensed under the *Environmental Protection Act 1994*. Extraction of rock or other material and screening under a mining tenement or an authority, lease or licence does not constitute an ERA, providing it is not exported from the site for sale, which will not be the case for the Isaac Plains Project.

The majority of material required for construction of infrastructure will be sourced on-site through a balanced cut and fill.

4 GENERAL

BCC have the necessary financial resources and capabilities to construct, operate and successfully rehabilitate the Isaac Plains project on completion of mining. BCC will provide a financial assurance in the amount and form required by the EPA, which will be determined through the Plan of Operations process, prior to commencement of the activity.

BCC is also committed to appropriate maintenance of plant and equipment necessary to support compliance with this EMOS and conditions of Environmental Authority (EA). Monitoring will be undertaken in accordance with relevant standards with records kept for a minimum of five years. Pertinent records will be made available to the EPA, upon request.

All flammable and combustible liquids will be appropriately stored and handled in accordance with AS1940 *The Storage and Handling of Flammable and Combustible Liquids 1993*.

4.1 PROPOSED EA CONDITIONS

- (A1-1) Provide a financial assurance in the amount and form required by the administering authority prior to the commencement of activities proposed under this environmental authority.
- (A1-2) The financial assurance is to remain in force until the administering authority is satisfied that no claim on the assurance is likely.
- (A2-1) The environmental authority holder must ensure:
 - that all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority are installed; and
 - that such measures, plant and equipment are maintained in a proper condition; and

Environmental Management Overview Strategy

- that such measures, plant and equipment are operated in a proper manner.
- (A3-1) Record, compile and keep for a minimum of five years all monitoring results required by this environmental authority and make available for inspection all or any of these records upon request by the administering authority.
- (A3-2) Where monitoring is a requirement of this environmental authority, ensure that a competent person(s) conducts all monitoring.
- (A4-1) Spillage of all flammable and combustible liquids must be contained within an on-site containment system and controlled in a manner that prevents environmental harm (other than trivial harm) and maintained in accordance with Section 5.9 of AS 1940 Storage and Handling of Flammable and Combustible Liquids of 1993.
- (A5-1) Words and phrases used throughout this EA are defined in Definitions. Where a definition for a term used in this EA is sought and the term is not defined within this EA, the definitions in the Environmental Protection Act 1994, its Regulations and Environmental Protection Policies must be used.

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5 AIR

5.1 ENVIRONMENTAL VALUES

The Isaac Plains site is located in a rural area with existing coal mining to the north (including the Burton Coal Mine CHPP, load out and rail loop), methane gas extraction (CH₄) to the west and the Peak Downs Highway to the south. The Kerlong Range (approx 500 m AHD) and foot-slopes generally provides shielding to the east. Exploration is currently occurring on several EPCs in the area and several mining leases are also proposed in these areas.

The principal sources of dust include traffic on the various local gravel roads including the Burton Mine Emergency Access gravel road (regularly used for local access in the area), coal trains, general farming traffic (tractors, trucks, light 4WDs), cattle and fire burn-offs (ash). Existing air pollution is mostly confined to dust generating activities with the principal pollutants being total suspended particulates (TSP) and respirable particulates less than 10 microns in diameter (PM₁₀).

The primary emissions associated with the proposed mine are also TSP and PM₁₀. Coal dust has varying impacts based on particle size. Health impacts arise primarily from small respirable particulates while the larger particulates can settle from the air to form deposited residue potentially causing a non-health related impact.

The nearest sensitive receptors to the proposed mine are three homesteads (3) Prejudice the protection of an individuals right to privacy. The location of the homesteads with respect to the proposed mine and other notable areas is provided in **Table 5-1** below.

Table 5-1 Nearest Sensitive Receivers

Receiver	Distance (km) From Source and Direction			
	Isaac Plains Coal Mine Footprint	Moranbah	Goonyella-Hay Point Railway Line	Peak Downs Highway
Prejudice the protection of an individuals right to privacy	3 NE	12 NE	1 km S	4.8 NW
Prejudice the protection of an individuals right to privacy	1.8 SE	12 E	7 km S	0.25 NW
Prejudice the protection of an individuals right to privacy	3.5 SW	5 E	8 km S	5.5 NW

Moranbah Township is approximately 7 km to the SW of the Isaac Plains site.

Baseline air quality measurements were undertaken at the Homestead by ASK Consulting Engineers, over a seven day period from 14th October to 21st October 2004, as summarised in **Table 5-2**. Measurements were obtained using an Osirus real-time dust monitor to record ambient dust concentrations.

Table 5-2 Baseline Air Quality Monitoring

Location	Ambient Concentration (µg/m ³)		
	Total Particulates	PM ₁₀	PM _{2.5}
Prejudice the protection of an individuals right to privacy	13	6	2

The monitoring was undertaken following a rain event resulting in extremely low dust levels, which is not typical of conditions in the area for the majority of the year.

The *Environmental Protection Policy (Air) 1997* (EPP (Air)) defines an unreasonable release of a contaminant to the air environment as the release of odours, dust, smoke or other atmospheric contaminants that-

- a) causes unlawful environmental harm; and
- b) is unreasonable having regard to the following matters-
 - (i) its characteristics;
 - (ii) its intrusiveness;
 - (iii) other releases of contaminants at the place affected by the release;
 - (iv) where the effects of the release of the contaminant can be noticed;
 - (v) the order in which the person releasing the contaminant started to carry out the activity from which the release is made and persons affected by the release started to carry out other activities that may be affected by the release of the contaminant.

Schedule 1 of the EPP (Air) nominates relevant air quality indicators and goals. Relevant air quality indicators for the proposed operation are as the follows:

- Total suspended particulate 90 $\mu\text{g}/\text{m}^3$ averaged over a year; and
- PM_{10} 150 $\mu\text{g}/\text{m}^3$ averaged over 24 hours, and 50 $\mu\text{g}/\text{m}^3$ averaged over a year.

5.2 POTENTIAL IMPACTS

5.2.1 Dust

The main source of nuisance on air quality from the proposed mine is dust from the following activities:

- clearing vegetation and removal of topsoil;
- drilling and blasting overburden;
- removing and relocating overburden;
- coal crushing, stockpiling and loading; and
- gas emissions from mobile plant exhaust.

In addition to these activities, dust generation will occur through wind erosion of stockpiles and areas of bare soil. Vehicle generated dust is also partially wind dependent. The major pollutants are particulates and the main categories of particulates are TSP and PM_{10} as previously described. Emissions from internal combustion engines are significant in determining the greenhouse gas emissions but contribute only a small fraction of the particulate load.

Potential impacts on air quality were assessed using 'Ausplume'; an air quality Gaussian dispersion model recognised and accepted by Australian regulatory agencies including the Queensland EPA. The following data was used for the model.

- Ausplume meteorological data file for Emerald, obtained from Queensland EPA. Winds are generally from the east;
- Emission factors were calculated using Table 1 'Emission factor equations and default emission factors for various operations at coal mines', from Australian National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining Version 2.3, dated 5/12/2001;
- Total mine throughput of 1.9 Mt/annum run of mine;
- Stockpiles, equipment locations, and haul truck routes, determined from the 1, 5 and 9 year conceptual layouts;

- Background levels from the monitoring campaign (refer Table 5-2; NB - results from the monitoring campaign followed a rainfall event, which occurs infrequently in the area); and
- Control efficiency levels of 0% are assumed for all sources (i.e. excluding the proposed dust control measures such as watering stockpiles and haul routes) to represent a worst case scenario.

A summary of the Ausplume modelling results at the sensitive receptors is provided in **Table 5-3**.

Table 5-3 Calculated Dust Concentration (in $\mu\text{g}/\text{m}^3$) at Noise Sensitive Places

Receptor	PM10 _{24hour av.}	PM10 _{1 year av.}	TSP _{1 year av.}
Prejudice the protection of domestic individuals right to privacy	76	10	26
Prejudice the protection of domestic individuals right to privacy	56	8	19
Prejudice the protection of domestic individuals right to privacy	98	14	39
Criteria (EPP (Air))	150	50	90

The Ausplume modelling demonstrates that dust emissions from the proposed mine will satisfy the dust criteria at all sensitive places for a worst case scenario of no dust control measures and low background levels (following rainfall).

Despite modelling predictions that dust generated from the proposed mine is not likely to exceed dust criteria at the nearest sensitive places, the following dust control measures are recommended, in accordance with best practice industry standards:

- All overburden stockpiles will be revegetated as quickly as practically possible to minimise dust emissions.
- Haul roads and other dust generating work areas will be watered by water trucks to minimise dust generation.
- All earth moving equipment will have the appropriate exhaust systems to minimise diesel particulate emissions.
- It is recommended that a dust deposition-monitoring program be carried out at all three residences prior to operations and for a minimum period of 12 months following commencement of operations.

While the proposed mine will be a source of dust, it is well separated from the nearest sensitive places by more than 1.8 km.

5.2.2 Smoke

Smoke may be generated occasionally by burning cleared vegetation or spontaneous combustion generated from stockpiled coal or reject although the Leichhardt Seam coals are generally not prone to spontaneous combustion.

5.2.3 Greenhouse Gas

Greenhouse gas emissions from the operation of the mine are predominantly from electricity and diesel use. Some methane emissions may occur from the coal seam at very low concentrations given the shallow depth of coal. Greenhouse gas emission as estimated at approximately 40,000 – 45,000 tonnes of CO₂ equivalent gas per year. Oxides of carbon, nitrogen and sulphur would also be emitted in vehicular emissions however these emissions are minor in comparison. The concentration of methane is not likely to exceed 1%, and consequently is not considered to have an adverse effect on air quality.

5.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES - AIR	
Environmental Value	Existing ambient air, with some elevated particulate concentrations during dry periods from fire, and surrounding grazing lands and mining, at sensitive receptors (local residences).
Environmental Protection Objective	Maintain ambient air quality levels and ensure sensitive receptors are not adversely affected.
Performance Indicators/Criteria	<p>Monitoring undertaken in response to complaints to show deposition of dust does not exceed 120 mg/m²/day and, averaged over one month at the lease boundary. Monitoring must also be undertaken in response to complaints to show concentrations of suspended particulate matter (PM₁₀) do not exceed 150 µg/m³ over a 24 hour averaging time, at the lease boundary monitoring points</p> <p>Dust to be measured in accordance with <i>AS3580 Method for Sampling and Analysis of Ambient Air</i>.</p>
Control Strategies	<p>Water haul roads and other unsealed roads with high traffic loads.</p> <p>Provide dust suppression sprays at locations in coal handling facilities that produce excessive dust (e.g., crusher, conveyor transfer points).</p> <p>Avoid burning cleared vegetation when wind will be blowing towards sensitive receptors.</p> <p>Avoid topsoil stripping and replacement on days with wind speed is sufficient to carry visible dust beyond the mine lease boundary.</p> <p>Investigate any dust complaint expeditiously and respond to complainant.</p> <p>Use fuel and electricity as efficiently as possible and require contractors to conduct preventative maintenance on equipment and engines to reduce excessive greenhouse gas emissions.</p> <p>Any spontaneous combustion on the lease will be extinguished, and all exposed coal faces in the final voids are covered to minimise its occurrence.</p> <p>While controlled burning is an efficient and essential means of removing organic debris from mining areas, it will be undertaken only in periods when wind conditions will not produce detrimental effects on local homesteads. However, the number and duration of burn-off periods will be limited so that high levels of particulate concentration will only be short term.</p>
Commitment 1	Dust monitoring will be undertaken on a monthly basis for the first 12 month period after the commencement date of the environmental authority and thereafter at the monitoring locations and frequency detailed in the Plan of Operations.
Commitment 2	BCC will respond to complaints within 72 hours. Where monitoring is required to verify a complaint or as directed by the administering authority, it will involve dust deposition and/or particulate monitoring and comparison against the licence limits of 120 mg/m ² /day (averaged over one month) and 150 µg/m ³ (over a 24 hour averaging time) respectively at the complainants residence.
Commitment 3	Dust mitigation measures will be detailed in the Plan of Operations.
Commitment 4	Burning of waste vegetation from land clearing activities will not be undertaken without the appropriate permit. Neighbours will be notified at least 24 hours prior to burning of vegetation and no burning will take place if the average forecast wind speed is greater than 10 knots.
Commitment 5	Energy use and greenhouse gas emissions will be monitored and minimisation strategies detailed.

5.4 PROPOSED EA CONDITIONS

- (B1-1) Subject to Conditions (B1-2) and (B1-3) the release of dust or particulate matter or both resulting from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
- (B1-2) When requested by the administering authority, dust and particulate monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.
- (B1-3) If the environmental authority holder can provide evidence through monitoring that the following limits are not being exceeded then the holder is not in breach of (B1-1):
- a) Dust deposition of 120 milligrams per square metre per day, averaged over one month, when monitored in accordance with AS 3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulates - Deposited matter - Gravimetric method of 1991; and
 - b) A concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 150 micrograms per cubic metre over a 24 hour averaging time, at a sensitive or commercial place downwind of the operational land, when monitored in accordance with:
 - Any alternative method of sampling PM10, which may be permitted by the 'Air Quality Sampling Manual' as published from time to time by the administering authority.
- (B1-4) If monitoring indicates exceedence of the relevant limits in Condition (B1-3), then the environmental authority holder must:
- a) address the complaint including the use of appropriate dispute resolution if required; or
 - b) immediately implement dust abatement measures so that emissions of dust from the activity do not result in further environmental nuisance.

RTI DL RELEASED EHP

6 WATER

6.1 ENVIRONMENTAL VALUES

6.1.1 Surface Water

Two waterways traverse the Isaac Plains site, including Smoky Creek and an Unnamed Watercourse. Both waterways feed into the Isaac River, approximately 5 km to the southwest of the mine. The location of waterways with respect to the mine is illustrated in **Figure 6-1**.

The Isaac River, Smoky Creek and the Unnamed Watercourse are ephemeral.

The catchment of the Isaac River upstream of the subject site comprises mainly scattered to medium dense bushland, grazing land and the township of Moranbah, approximately 8km from the site. Several coal mines already exist in this catchment, including Moranbah North, Goonyella, Riverside, and North Goonyella.

The environmental values of the Isaac River and local creeks immediately downstream of the site, in accordance with Section 7 of the *Environmental Protection (Water) Policy 1997*, include **biological integrity of a modified aquatic ecosystem** and **agricultural use**.

The relevant water quality Guidelines for protection of environmental values include:

- ANZECC (2000) water quality guidelines for irrigation and general water usage;
- ANZECC (2000) water quality guidelines for livestock drinking water quality; and
- ANZECC (2000) water quality guidelines for Aquatic ecosystems.

No baseline water quality monitoring data is available for Smoky Creek or the Unnamed Watercourse.

Regional water quality can be described by water quality data for Phillips Creek (joins the Isaac River approximately 85 km downstream) and Devlin Creek (joins the Isaac River approximately 120 km downstream), which have similar characteristics and size as Smoky Creek and the Unnamed Watercourse. A review of the water quality data indicates the following points:

- The concentrations of total suspended solids (TSS) are moderately high (median range of 46 – 64 mg/L);
- Total dissolved solids (TDS) are typically low with median concentrations ranging from 94 - 244mg/L for the local creeks;
- pH is neutral, with pH varying from 7.2 to 8.1; and
- The major ions are bicarbonate, calcium, chloride, fluoride and sulphate. Chloride levels in particular are higher than the ANZECC standards for ecosystem protection while fluoride and calcium levels are low.

River water quality for the Isaac River can be described by three stations along the Isaac River, including Burton Gorge (approx 72 km upstream of site), Goonyella (approx 32 km upstream of site) and Deverill (approx 30 km downstream of site). The data from these stations highlights the following points:

- Conductivity decreases from Goonyella (566 $\mu\text{S/cm}$) to Deverill (235 $\mu\text{S/cm}$) and are suitable for irrigation (ANZECC standard for irrigation is 1300 $\mu\text{S/cm}$ and stock watering 2000 $\mu\text{S/cm}$). Background conductivity at Goonyella exceeds the ANZECC criteria for ecosystem protection (350 $\mu\text{S/cm}$);
- pH is within the ANZECC range for ecosystem protection (6.5 – 7.5);
- All metals, ions and anions are within the ANZECC criteria, with the exception of chloride (30 - 153 mg/L), which exceeds the ANZECC ecosystem protection standard (0.02 mg/L) but is suitable for irrigation (175 mg/L);
- There is insufficient data available to make any conclusions regarding nutrients;
- TSS is high, but decreases in a downstream direction from Burton Gorge (230mg/L) to Goonyella (170mg/L) and then to Deverill (127 mg/L); and
- Receiving waters have a moderate hardness (70 to 78mg/L) but are suitable for irrigation.

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P:\Projects\Bowen Central Coal\BCC401 Isaac Plains Project\Map\Figures\2005\Catchment Areas EWP05



Legend

- Catchment area
- Surface water flow direction

**Bowen Central Coal Management Pty Ltd
Isaac Plains Project**

Catchment and Waterways

Datum: AGD66
Projection: TM, Zone 55

2 0 2
kilometres

FIGURE 6-1

6.1.2 Groundwater

The Isaac Plains project area is located within the Highlands Subartesian Area (DNRM, 2000). Overall groundwater movement is from the east to west, correlating broadly with topographic fall of the regional terrain. Groundwater in the vicinity of the proposed open cut pits is typically intercepted within 30m below ground surface in Permian sandstone/siltstone units; between approximately 40m and 125m below ground surface in the Leichhardt Coal Seam; and typically beneath the coal seam within Permian lithic sandstone units. Water levels within bores installed within and below the coal seam typically rise to within approximately 30m of the ground surface.

A total of eleven regional landholder groundwater bores have been identified within a radius of 10km of the proposed open cut pit. A summary of the type of groundwater use and source is provided in **Table 6-1** below. Eight of the eleven identified bores are not in use or have been destroyed. Two bores are equipped with submersible pumps, and one bore is used by the Department of Natural Resources and Mines (DNRM) for monitoring purposes.

Table 6-1 Summary of Groundwater Use and Source

Use	No. of bores	Alluvial Source	Basalt Source	Permian Source	Unknown Source (alluvial, basalt or Permian)
Domestic Water	2	2	-	-	-
Industrial	2	-	-	2	-
Stock Water	-	-	-	-	-
Monitoring	1	-	-	1	-
Fire Control	1	-	-	-	1
Unused	5	-	-	-	5
Total	11	2		3	6

The spatial occurrence of groundwater throughout the Moranbah region is sporadic. Consequently, groundwater is not extensively used throughout the region.

The permeability of selected aquifers was determined through slug testing. A summary of the results is provided in **Table 6-2** below.

Table 6-2 Results of Hydraulic Testing and Analysis

Site	Bore	Aquifer	SWL (mbGL)	K (m/day)	Analysis Method
6	AC6	Permian sandstone/siltstone	27.69	0.0001	Bouwer and Rice Slug Test (1976)
	C6	Leichhardt Coal Seam	27.70	0.01	Bouwer and Rice Slug Test (1976)
3	BC3	Permian lithic sandstone	13.38	0.009	Bouwer and Rice Slug Test (1976)

Note: SWL = Static Water Level (meters below ground level)
K = hydraulic conductivity (permeability)

Existing groundwater quality does not meet the ANZECC stockwater guidelines, long-term irrigation guidelines and aquatic ecosystems guidelines. The median values for electrical conductivity, pH, and total dissolved solids are in excess of all guidelines, severely limiting the use of groundwater for most purposes. No reduction in aquifer water quality is expected during the mining operation. A summary of groundwater quality monitoring undertaken as part of the Environmental Assessment study is provided in **Table 6-3** below.

Table 6-3 Groundwater Quality from Existing Bores

Bore ID	Electrical Conductivity (mS/cm)	Total Dissolved Solids (ppK)	pH	Oxidation/Reduction Potential (mV)	Temperature (°C)
Permian sandstone/siltstone aquifer					
AC1	16.370	8.643	8.56	-59	28.0
AC4	14.220	7.439	8.48	-13	27.1
AC6	23.950	12.550	7.88	-35	31.1
Leichhardt Coal Seam					
C1	8.081	4.071	8.56	-41	23.8
C3	6.675	3.318	8.55	-22	28.5
C4	13.120	6.840	7.89	-25	27.0
C6	21.680	11.690	7.25	-101	31.8
Permian lithic sandstone aquifer					
BC2	24.110	13.270	8.25	-7	28.9
BC3	8.253	4.154	8.40	-43	29.3
BC5	28.880	16.750	8.22	-16	29.1

6.2 POTENTIAL IMPACTS

6.2.1 Surface Water

6.2.1.1 Mine Water System

There will be a number of potential sources of contamination which may impact on local water quality at the Isaac Plains Mine. These are listed in **Table 6-4**.

Table 6-4 Potential Water Contamination Sources

Sources	Potential Contaminants
Overburden dump and coal stockpile	Runoff containing suspended solids and dissolved salts.
Pit	Suspended solids and dissolved salts
Infrastructure	Petroleum hydrocarbons, detergents, degreasers suspended solids
Sewage treatment plant	Coliform bacteria and nutrients

The mine water management system has been designed based on three water components including:

- Clean Water: A network of clean water diversion drains and levees prevents clean water from entering the project area;
- Mine Water: All inflows to the pits, and runoff from areas where surface flow may carry high levels of dissolved solids, is contained on site in two large release dams. Infrequent controlled releases will be necessary to maintain mine workability after very heavy rainfall. Discharges may be made from these dams under strict conditions that protect downstream water quality.
- Sediment Management System: Sediment dams control areas of the development which may generate surface runoff with high levels of suspended solids. Additionally, progressive rehabilitation of mine spoil is designed to reduce sediment loads back to natural levels in the shortest possible time.

Conceptual water management plans have been developed for the mine based on the 1, 5 and 9 year mine layouts and illustrated in **Figure 6-2**, **Figure 6-3**, and **Figure 6-4**

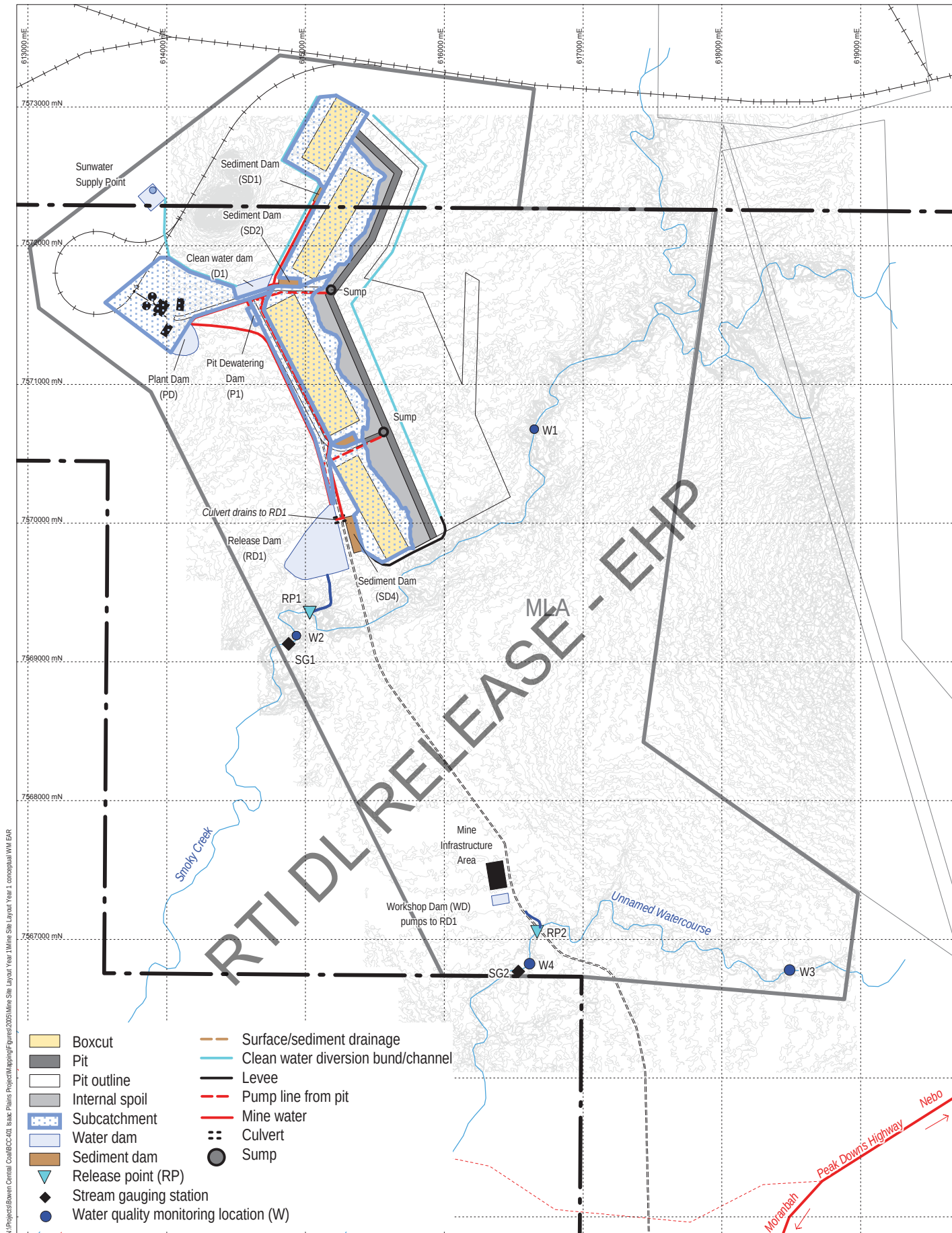
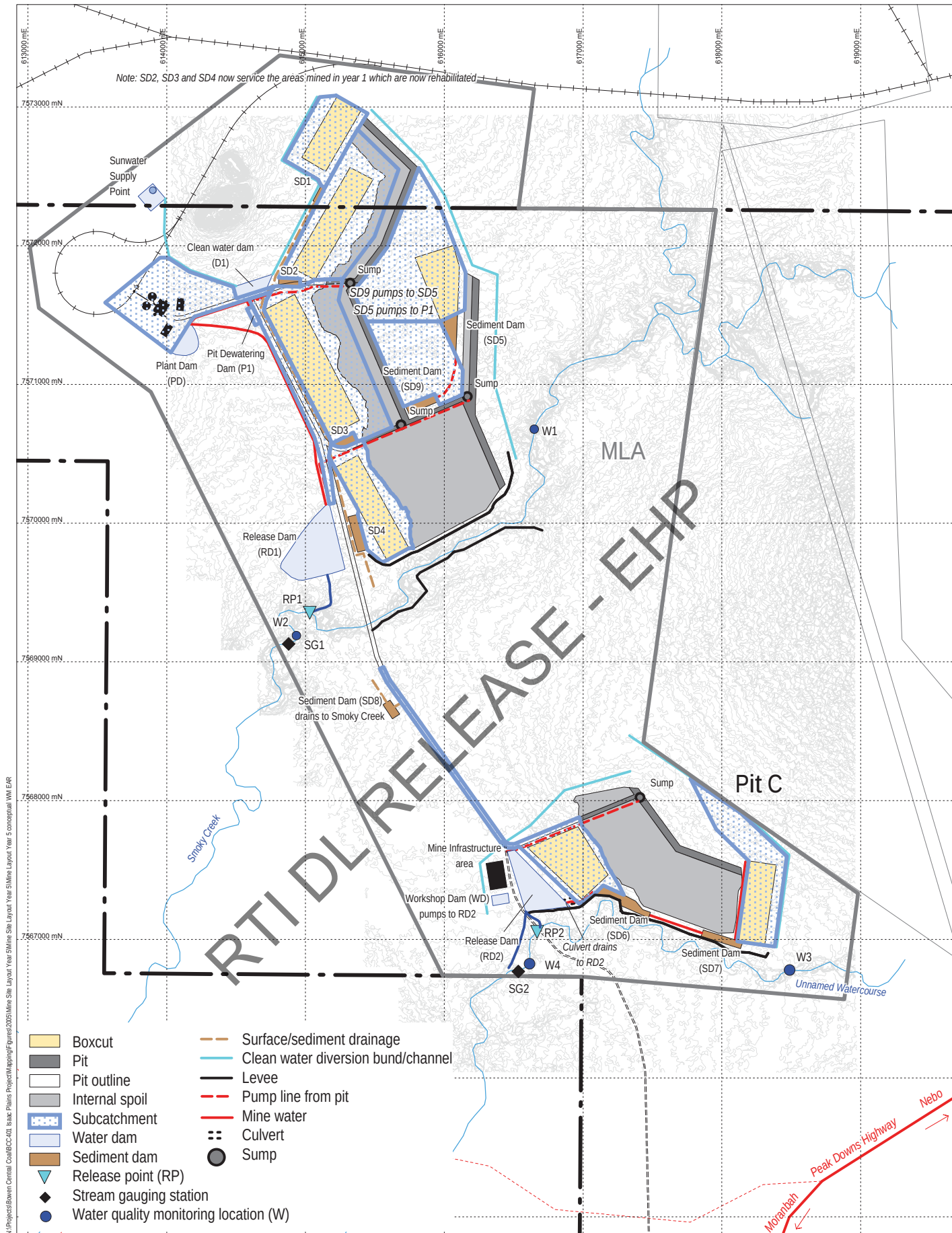


FIGURE 6-2



- Legend
- EPC 755 boundary
 - Drainage
 - MLA boundary
 - Access road
 - Haul road
 - Infrastructure

Bowen Central Coal Management Pty Ltd
Isaac Plains Project
Conceptual Water Management Plan Year 5

Note: Location of W2, SG1, W4 and SG2 should be located outside the initial mixing zone, a minimum of 200m from final location of the release point. Location of final release point will be subject to detailed design.

Datum: AGD66
 Projection: TM, Zone 55

500 0 500 1000 1500
 metres

FIGURE 6-3

Mine water will be reused to meet site water demands to both conserve water and to provide a source for the scarce resource in the area. However, water balance modelling shows that recycling of mine water alone is not sufficiently consistent to meet the 540 ML annual demand. Water balance modelling indicates that shortfalls in meeting demand are likely in most years.

BCC has entered into an agreement with Sunwater to supply up to 540 ML per annum from Eungella Dam from 1 November 2005. The Sunwater supply will therefore make up shortfalls from water reuse.

In order to protect downstream water quality, controlled releases will only occur when existing flows in the creek or watercourse are large enough to enable a minimum acceptable dilution ratio to satisfy the criteria that discharges should result in less than a 10 % increase in background water quality. This ensures that salts, sediments and other contaminants contained in mine water can be accommodated by the natural hydrological system, by diluting these to levels that do not cause environmental harm.

The water management system for the project has been designed to maintain water quality within the creeks downstream of the mine within 10% of the background concentrations. To achieve this, the following measures are implemented:

- water from the mine water catchment is released at a controlled rate during flow events to the creeks to ensure that the pH and electrical conductivity of the water downstream of the mixing zone is not increased by more than 10% above background levels;
- stormwater run-off from all disturbed areas will be contained within the sediment dams or mine water storage dams for a sufficient period of time to allow sediments to settle prior to release to the environment;
- the chemical characteristics of the overburden mean that there is a limited risk of low pH water being discharged from the spoil emplacements and pH will be maintained within the range of 6.5 – 7.5;
- oil/water separators on the workshop dam, bunding of fuel storage and workshop areas will ensure that no visible oils and grease are present in the discharge.

A design dilution ratio was calculated to estimate the potential for releases from RD1 and RD2 to Smoky Creek and the Unnamed watercourse respectively (Table 6-5). Pit water inflows comprise direct rainfall, inflows from aquifers above the coal seam and inflows from the coal seams. The estimated conductivity of the mine water was based on a weighted average of the TDS concentrations and flow volumes for groundwater inflows to the pits, direct rainfall over the pit and run-off and from the coal stockpiles and spoil emplacements. The estimated in pit conductivity is similar to values observed at operation mines in the area.

Table 6-5 Calculation of Dilution Ratio

	Conductivity (µS/cm)
Background Level (Isaac River)	511
Estimated pit water conductivity (from groundwater quality data)	7788
Target Conductivity (10% above background)	562
Thus $511Q_1 + 7788Q_2 = 562Q_3$	
After solving for $Q_2:Q_1$,	
Dilution Ratio	140:1

A water management system will be implemented that consists of:

- preventing clean water from entering the project area via a system of diversion drains and levees;
- reducing runoff from spoil emplacements by shaping and progressive rehabilitation using a system that encourages internal pondage and drainage;
- redirecting run-off from areas that involve soil disturbance into sedimentation dams located at the lower end of the catchment of disturbed areas. Sediment dams are to be designed in accordance with the Institute of Engineers Queensland Division Soil Erosion Guidelines for Queensland Construction Sites (1996);

- containing run-off from the coal handling and preparation plant area, haul roads, and un-rehabilitated areas;
- bunding the mine infrastructure area to prevent external flows entering the area, capturing and directing run-off from within the area to a dam, using the water collected in the dam for washdown, and containing and treating washdown waters via an oil/water separator. All hydrocarbon and petroleum products shall be banded in accordance with AS1940 *Storage and Handling of Flammable and Combustible Liquids*;
- appropriately treating on-site sewerage via a package treatment plant/septic tanks/land irrigation system;
- re-using water from the water management system to meet on-site demands, thereby reducing the need for discharging the water;
- controlling the (infrequent) discharges of mine water to Smoky Creek and the unnamed watercourse under high flow conditions, with sufficient dilution (minimum 140:1) to avoid adverse environmental impacts; and
- designing the mine water management system (in the rare and unexpected event of flood failure) to overflow to the pit, rather than to the natural drainage system.

All dams are designed to provide full containment of storm events up to the 24 hour 1 in 10 year event from their respective catchments. Note that almost all mine water will be recycled rather than discharged. Controlled mine water discharges will only occur during a limited number of high flow events.

Because mining will be via truck and shovel method, boxcut spoil and internal spoil areas can be reshaped during placement. Runoff from the external boxcut slope will drain externally with the spoil dumps to be shaped to encourage internal ponding. External runoff from these areas will be controlled by sediment dams designed in accordance with the sediment and erosion control guidelines (IEAust 1996) with a typical length to width ratio of 3:1, combined with storage to contain the 24 hour 1 in 10 year event. This allows sufficient settling time to reduce sediment loads to acceptably low levels.

During initial phases of rehabilitation, it is expected that dissolved solids in the runoff may be high. During this period, runoff that has been treated in sediment dams will report to the mine water management system. After a sufficient period (nominally four years) to allow revegetation and leaching of salts from the upper soil profiles, grab sampling of outflows of sediment dams will be undertaken to confirm that concentrations of salts in the runoff are within acceptable levels in receiving waters. When this is verified, outflows from the sediment dams will be directed into the natural drainage system and will no longer be part of the mine water management system.

Groundwater inflows into active pits will be captured in sumps and pumped to either a pit dewatering dam, or directly into a release dam.

The results of the geochemical testing indicates that overburden at Isaac Plains will be non-acid forming, however fine coal rejects are considered potential acid forming (PAF). Coal rejects will be alkali blended (or co-disposal) with overburden material, which has a high buffering capacity and encapsulated/covered at depth within spoil dumps to reduce the risk of ARD.

Overburden has a low to slight salinity and therefore saline conditions or salt release are not expected to be a concern for water quality or revegetation.

In conclusion, any mine-derived changes to suspended solids, salinity or pH are not expected to have any impact of the use of downstream water for protection of modified aquatic ecosystems or agricultural use. The mine water management system for the 1, 5 and 9 year life of mine is shown in Conceptual Water Management Plan.

6.2.1.2 Water Supply

The water supply for the Mine site comprises raw water supply and potable water supply. Raw water supply is likely to be made up from two main sources (refer Conceptual Water Management Plans):

1. Preferential recycling of water held in dams (cleanwater diversion) within the Mine water management system;
2. Sunwater water supply pipeline up to 540 ML/annum.

Water supply may also be supplemented from groundwater bores or trucked into site. Potable water will be met by a water supply pipeline or trucking water to site.

6.2.2 Groundwater

6.2.2.1 Pit Inflow

The impact of open pit mining creates a break in the continuity of any groundwater system when the excavated void intersects water bearing aquifers. Groundwater seeps into the open pit from the various aquifers, adding to the water accumulating in the pit from rainfall runoff and seepage from spoil, and is collectively known as pit water. The aquifers are typically of varying thickness and hydraulic conductivity. Subsequently, some aquifers seep more readily and consistently over time into the pit. The Permian sedimentary unit and the Leichhardt Coal Seam are examples of long-term seepage sources into the proposed pits.

The combined aquifers (Permian sandstone/siltstone and Leichhardt Coal Seam) have an average hydraulic conductivity range of between 0.001 - 0.026 m/day for the saturated thickness above the base of the pit. As discussed above, the maximum depth of the open pit will be approximately 70m, with a saturated thickness of approximately 40m. The rate of groundwater inflow through the walls of the open pit has been assessed analytically using Darcy's Equation.

Total annual groundwater inflows into all pits for years 1, 5 and 9 of the proposed mine operation are shown in **Table 6-6**. Calculation of total groundwater inflows per year is based on the following assumptions:

- regional water table does not alter appreciably over time;
- initial conditions used are representative of a long term average from field data gathered in 2004; and
- multi-layered aquifers can be represented adequately using block averaged hydraulic properties.

The results, according to the above assumptions, are presented as follows:

- the Permian sandstone/siltstone aquifer above the coal seam and Leichhardt Coal Seam aquifer are homogenous in their permeability. This assumption provides conservatively low estimates of pit water inflows that need to be managed at the surface to ensure that environmental discharge criteria are met (column A and B).
- the Permian sandstone/siltstone aquifer above the coal seam and Leichhardt Coal Seam are heterogeneous in their permeability. Faulting is observed throughout the Permian units. Faulted areas have been noted to produce significant water volumes. This assumption provides a higher estimate of pit water inflows (column C).

Table 6-6 Estimated Groundwater Inflows to Pits A, B and C Combined

Year	Inflow (ML/year) range for homogenous aquifers		Inflow (L/s) range for faulted aquifers*
	(A) $K_{\text{average}} = 0.001\text{m/day}$	(B) $K_{\text{average}} = 0.026\text{m/day}$	(C) $K_{\text{average}} = 0.05\text{m/day}$
1	0	0	0
5	0.42	14.6	1.2
9	1.1	27.9	1.8

Note: Proposed year 1 pit depth (~30m) does not intersect the water table

* Faulted aquifer K (m/day) is calculated as approximately above that of column A, and represents peak inflows over a typically short period of time. Hence, due to short time periods the values are expressed in L/s.

It is difficult to determine by analytical analysis the influence of faulting within the aquifers. An estimate of 0.05m/day has been applied as the bulk hydraulic conductivity for the faulted aquifers. Peak inflows associated with faulting are assumed to occur over a typically short period of time. Hence, values of peak inflows associated with faulted aquifers are represented as L/s.

The estimates of groundwater inflows listed in **Table 6-6** based on analytical calculations using Darcy's Law, can be applied when groundwater data are insufficient to perform numerical modeling analyses. The method does not take account of variable aquifer characteristics such as faulting, temporal variations in climate, and long-term measurements of precipitation and run-off.

6.2.2.2 Groundwater Levels

Potential groundwater drawdown around the pit has been assessed using the Dupuit Equation. The Dupuit Equation is an analytical method for analysing steady groundwater flow in an unconfined aquifer. Within the mine pit limit, a near-pit decline in groundwater levels of up to 40m is expected over the 9 year mine life. Hydraulic conductivity values and pre-existing regional groundwater contours suggest that the drawdown cone will result in a radius of influence of approximately 2km from the pit perimeter. The assumption of block averaged hydraulic conductivity, resulting in a conceptually homogenous and isotropic aquifer formation near the pit, gives rise to the anticipated drawdown contours in **Figure 6-5**.

Regional impacts are generally expected to be observed to the east and west of the mine site as illustrated in **Figure 6-5**. However, the major thrust fault (Isaac Thrust) located immediately east of the deposit may limit the extent of groundwater drawdown impact in the east. No operational bores are located within two kilometres of the pit, thus it is unlikely that operational bores will be affected by groundwater drawdown associated with the mine development.

Groundwater levels in the area are expected to recover over time once the mining operations cease. Initially, there will be a higher groundwater gradient between surrounding areas and the pit, and this will result in a more rapid flow of groundwater into the pit. As the pit fills post mining through a combination of groundwater seepage and rainfall, this gradient flattens and less groundwater flows into the pit from surrounding areas. Recharge in these surrounding areas begins to take effect and the groundwater levels eventually begin to rise again. Recovery rates will depend on annual rainfall, with drought periods extending the recovery period and wet years shortening the recovery period. Eventually a state of equilibrium will be reached.

6.2.2.3 Groundwater Quality

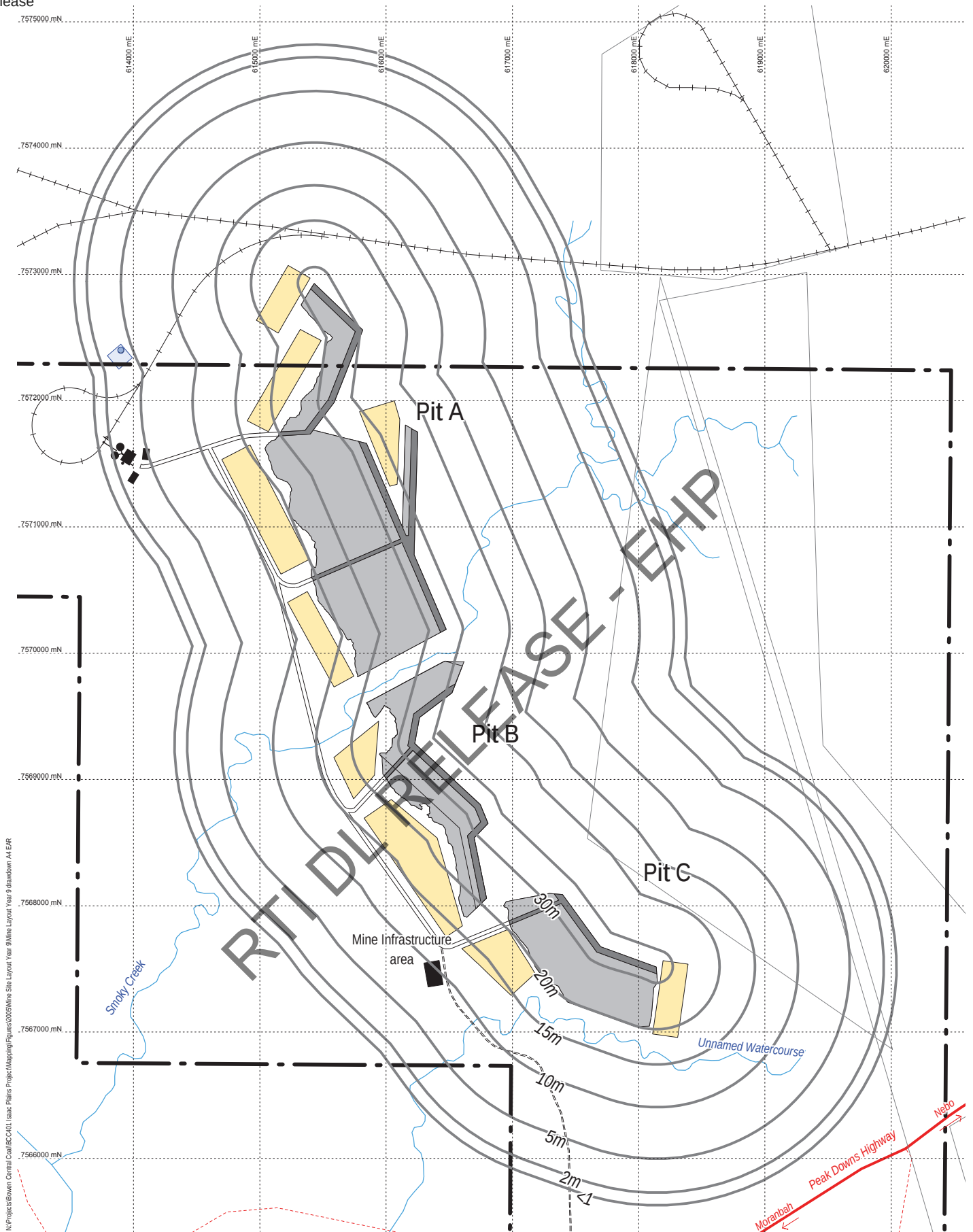
Analytical chemistry results indicate that groundwater in each of the major water-bearing systems (Permian sandstone/siltstone, Leichhardt Coal Seam and Permian lithic sandstone) are of similar quality to each other with respect to EC, TDS, pH, metals and major ions. Any mixing between systems induced by mining activities is not likely to result in a decline in the quality of groundwater within an individual aquifer.

A review of groundwater quality data in the area has indicated that groundwater is unsuitable for uses such as stock watering or domestic supply. Rainfall, and any runoff from rehabilitated areas that drain into the final void, will add volumes of water at better quality than groundwater inflows. This dilution will be partly offset by evaporative losses, which will serve to increase the concentrations of salt within the final void water. Qualitatively, final void water quality is expected to be saline.

6.2.2.4 Final Voids

Following rehabilitation of the mine site, voids will remain within Pits A, B and C. These final voids gradually fill with water, eventually reaching an average stable water level as inflows from groundwater and rainfall/runoff are balanced by evaporation losses. The final voids will remain after closure as lakes in the pits.

RTI DL RELEASE - EIR



N:\Projects\Bowen Central Coal\BCC\01 Isaac Plains Project\Mapping\Figures\2005\Mine Site Layout Year 9\Drawdown A4 EAP



Legend

- EPC 755 boundary
- ~ Drainage
- Overland flow
- Access road
- Haul road
- Infrastructure

- Contour of drawdown (estimate)
- Boxcut
- Pit
- Internal spoil

**Bowen Central Coal Management Pty Ltd
Isaac Plains Project**

Estimate of Groundwater Drawdown Year 9

Datum: ADG 84
Projection: TM, zone 55

0 500 1000
metres

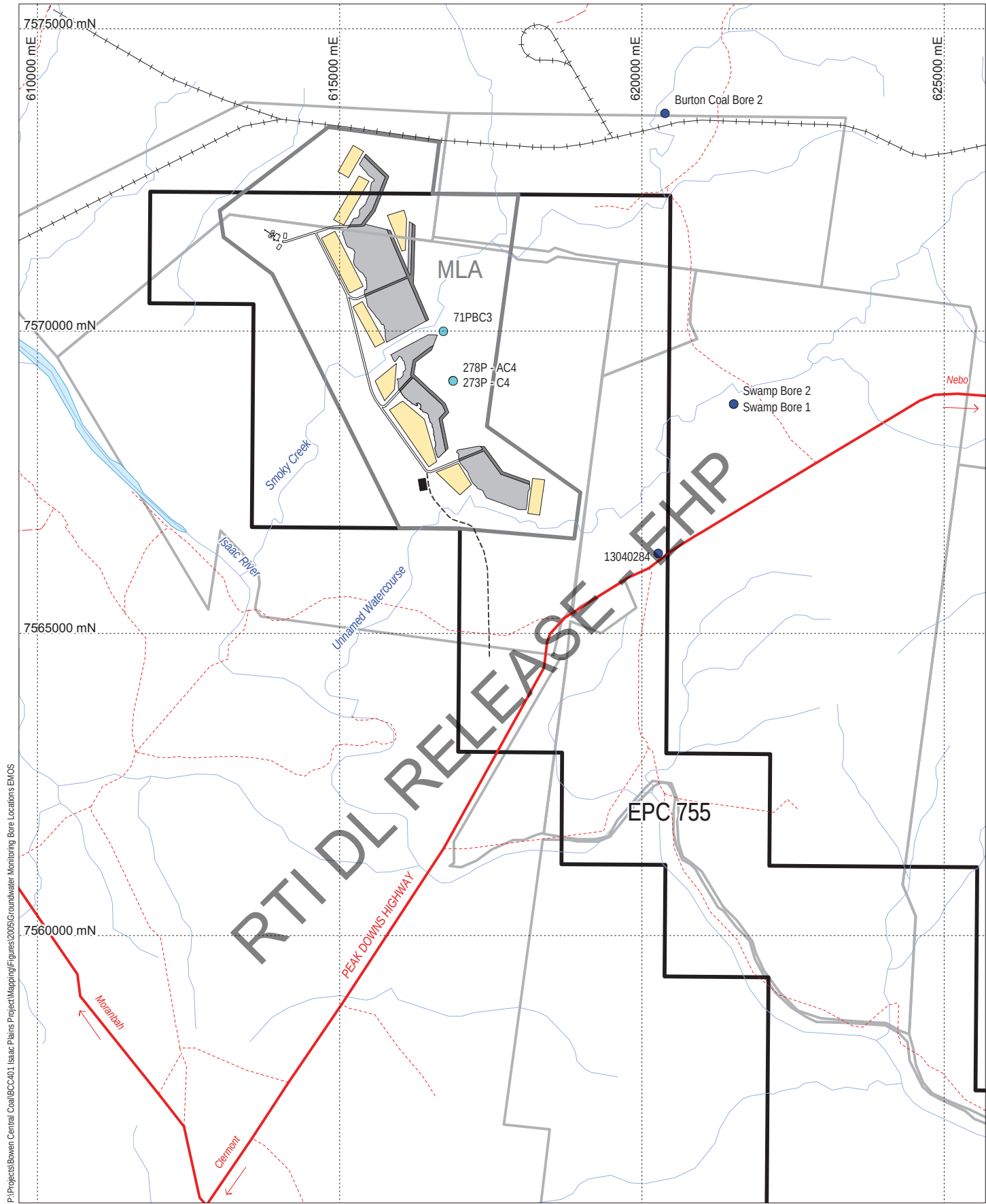
FIGURE 6-5

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6.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION & CONTROL STRATEGIES – SURFACE WATER	
Environmental Value	Biological integrity of a modified aquatic ecosystem of agricultural use in Smoky Creek, the Unnamed Watercourse and the Isaac River.
Environmental Protection Objective	To take all reasonable and practicable measures to avoid degradation of the environmental values of Smoky Creek, the Unnamed Watercourse and the Isaac River.
Performance Indicators/Criteria	<p>Water quality downstream, after initial mixing should not exceed 10% above background water quality. (EC, pH and turbidity)</p> <p>Treated Sewerage Effluent:</p> <ul style="list-style-type: none"> • BOD 5 mg/L; • Suspended Solids 30 mg/L; • pH 6.5 – 8.0; • Free Residual Chlorine 1 mg/L; and • Faecal Coliforms 1000 thermotolerant coliforms/100ml. <p>Laboratory analyses to be undertaken by a NATA-accredited laboratory.</p> <p>Water sampling to be undertaken in accordance with Water Quality Sampling Manual, EPA (3rd edition, 1999).</p>
Control Strategies	<p>Implement Water Management System generally in accordance with the Conceptual Water Management Plans. Changes that may result through the detailed design stage shall be incorporated into the Plan of Operations. Measures include:</p> <ul style="list-style-type: none"> • Divert clean water from undisturbed areas away from disturbed areas. • Direct rainfall run-off from all disturbed areas and sediment dams for settlement of suspended solids. • Direct all mine water to the Release Dams 1 and 2. • Manage controlled releases from Release Dams 1 and 2 to surface waters to achieve less than a 10% increase in background water quality. Site specific background water quality will be collected over time, as discussed below. • Reuse collected water as part of mining operations (eg dust suppressant on haul roads, CHPP, washdown, etc). <p>Treated sewerage effluent should be used for haul road dust suppression or the irrigation of rehabilitated areas, where possible.</p> <p>Bund fuel and hazardous material storages in accordance with AS1940.</p> <p>Develop a detailed surface water quality monitoring program as part of the Plan of Operations. The program should include:</p> <ul style="list-style-type: none"> • Collect baseline surface water quality data at upstream and downstream monitoring points prior to operations to provide a baseline reference measurement. Samples should be analysed for pH, TDS, TSS, anions, cations and metals and include As and Se (based on results of geochemistry analysis). • Installation and maintenance of continuous water quality monitoring point at the Smoky Creek downstream sample location to collect EC and pH continuously and linked to the Mine Infrastructure Area via telemetry. • Installation and maintenance continuous stream gauging stations should also be downstream of the Smoky Creek and Unnamed Watercourse release points to measure depth and flow.

ENVIRONMENTAL PROTECTION & CONTROL STRATEGIES – SURFACE WATER	
	<p>Develop a detailed groundwater quality monitoring program as part of the Plan of Operations. The program should include:</p> <ul style="list-style-type: none"> The potential for local impact on groundwater within the site should be monitored on a quarterly basis for levels and water quality (pH, EC, TDS, anions, cations and metals) from existing groundwater bores installed within the site. Climatic data such as rainfall, pan evaporation and wind speed/direction should also be regularly monitored. Pit water inflows should also be sampled and analytically analysed for water chemistry every six months. A review of the results will be undertaken every twelve months to assess potential impacts of mining and to review future monitoring needs and interpret current mine site impacts. The potential for impact on the regional groundwater aquifer should be monitored via three regional property groundwater bores (Burton Coal Bore 1, Swamp Bore 1, DNR 13040284) providing landholder access can be obtained. Should access be granted, the bores should be gauged prior to the commencement of mining and then annually. Groundwater samples should also be taken from the three regional bores on a schedule of once every year. All samples should be assessed for physico-chemical parameters such as Total Dissolved Solids (TDS), Electrical Conductivity (EC) and pH. Laboratory analysis of groundwater samples should also be undertaken for major ions, heavy metals, trace ions and toxic metals and compared against both stock watering and irrigation criteria in the ANZECC, 2000 guidelines. <p>Develop and implement a plan for emergency spills or discharges.</p> <p>Develop and implement a hazardous materials handling training program.</p>
Commitment 6	All runoff water from disturbed areas will be captured and managed on site within the mine water management system.
Commitment 7	Prepare Water Monitoring Plan as part of Plan of Operations. The Water Management Plan should include surface water monitoring at the general locations indicated in Figure 6-2 , Figure 6-3 and Figure 6-4 . Local and regional groundwater monitoring at the locations illustrated in Figure 6-6 .
Commitment 8	The discharge of all mine affected receiving waters in Smoky Creek and the Unnamed Watercourse to result in less than a 10% increase in background water quality (EC, pH and turbidity), after the initial mixing zone.
Commitment 9	<p>The water quality of sewerage effluent that may be released to the Environmental Dam and subsequently used for dust suppression should be monitored every three months for following criteria:</p> <ul style="list-style-type: none"> BOD(5 day); Suspended Solids; pH; Free residual chlorine; and Faecal coliform.
Commitment 10	All treated sewerage effluent used for dust suppression or irrigation will be contained on site.
Commitment 11	An investigation into final void water quality will be completed prior to mine decommissioning.



Legend

- | | | | |
|--|---------------------|--|-----------------|
| | Property Boundaries | | Principal Road |
| | EPC 755 boundary | | Minor Road |
| | Dams | | Track |
| | Creeks | | Regional Bore |
| | | | Monitoring bore |

Bowen Central Coal Management Pty Ltd
Isaac Plains Project
Groundwater Monitoring Bore Locations

Datum: AGD 84
Projection: AMG Zone 55

0 1000 2000
metres

FIGURE 6-6

6.4 PROPOSED EA CONDITIONS

- (C1-1) Receiving waters affected by the release of process water or storm water contaminated by the mining activities or both must be monitored at the locations and frequencies defined in Schedule C - Table 1 and **Figure 6-4** and comply with the contaminant limits defined in Schedule C - Table 2.

Schedule C - Table 1 (Receiving water monitoring locations and frequency)

MONITORING POINT	LATITUDE		LONGITUDE		MONITORING FREQUENCY
	AGD84	GDA94	AGD84	GAD94	
W1	616648	7570677	616761	7570588	pH & EC Continuous. Quarterly following a release
W2	614811	7569122	614924	7569300	Quarterly following a release
W3	618488	7566780	618600	7566958	Quarterly following a release
W4	616301	7566347	616414	7566525	Quarterly following a release

Schedule C - Table 2 (Receiving water quality limits)

PARAMETER	UNITS	MAXIMUM RECEIVING WATER QUALITY LIMITS – ANZECC IRRIGATION/AQUATIC ECOSYSTEMS GUIDELINE
pH	pH Units (range)	6.8-8.5
EC	µS/cm (max)	3000

- (C1-2) The discharge of all mine affected receiving waters in Smoky Creek and the Unnamed Watercourse to result in less than a 10% increase in background water quality, after the initial mixing zone.
- (C2-1) All reasonable and practicable erosion protection measures and sediment control measures implemented and maintained to minimise erosion and the release of sediment.
- (C3-1) All effluent released from the treatment plant must be monitored at the frequency and for the parameters specified in Schedule C - Table 2.

Schedule C - Table 2 (Sewage effluent water quality release limits)

Quality Characteristics	Release Limit	Units	Limit Type	Monitoring Frequency
5-day Biochemical Oxygen Demand (uninhibited)	5	mg/L	Max	Monthly
pH	6.5-8	pH Units	Range	Weekly
Free Chlorine Residual	1	mg/l	Max	Monthly
Faecal Coliforms, based on the average of a minimum of five samples collected	1000	Coliforms/100 ml	Max	Monthly

- (C3-2) Sewage effluent used for dust suppression or irrigation must not exceed sewage effluent release limits defined in Schedule C - Table 2.
- (C3-3) Sewage effluent used for dust suppression or irrigation must not cause spray drift or over spray to any sensitive or commercial place.
- (C3-4) In periods of wet weather or following wet weather, when no further irrigation of effluent is reasonably practicable and when effluent storage ponds are full, the release of effluent to waters is permitted from the release point(s) **RP2** defined in **Figure 6-4** and in accordance with the release limits in Schedule C - Table 2.

- (C4-1) Groundwater, affected by the mining activities must be monitored at the locations and frequencies defined in Schedule C - Table 3 and **Figure 6-6**.

Schedule C - Table 3 (Groundwater monitoring locations and frequency)

MONITORING POINT	LATITUDE		LONGITUDE		SURFACE RL (m)	FREQUENCY
	AGD84	GDA94	AGD84	GAD94		
AC4	6175265	617378	7569475	7569653	231	Quarterly
BC3	616563	616676	7569973	7570151	232	Quarterly
C4	617257	617367	7569504	7569682	232	Quarterly
Burton Coal Bore 2	620384	7573599	620496	7573777	246	Quarterly
Swamp Bore 1	621518	7568790	621630	7568968	249	Quarterly
DNR 13040284	620271	7566322	620383	7566500	246	Quarterly

- (C4-2) Subject to Condition (C4-1), groundwater levels must be monitored and groundwater draw down fluctuations in excess of 2m per year, not resulting from the pumping of licensed bores, must be notified within 14 days to the administering authority following completion of monitoring.
- (C4 -3) The method of water sampling required by this environmental authority must comply with that set out in the latest edition of the Environmental Protection Agency's Water Quality Sampling Manual.

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7 NOISE & VIBRATION

7.1 ENVIRONMENTAL VALUES

7.1.1 Noise

As discussed in Section 5.1, the Isaac Plains site is located in a rural area with existing coal mining (including the Burton Coal Mine CHPP, load out and rail loop) and the Goonyella to Hay Point Railway line to the north, methane gas extraction (CH₄) to the west and the Peak Downs Highway to the south. The Kerlong range generally provides shielding to the east. Exploration is currently occurring on several EPC in the area and several mining leased are also proposed in these areas.

The principal sources of noise include traffic on the Peak Downs Highway, existing Burton coal mine and CHPP, coal trains, native bird life, insects and general farming traffic (tractors, trucks, and light 4WDs) and cattle.

The nearest sensitive receptors are summarised in **Table 5-1**.

Baseline ambient noise measurements were conducted at the two closest residences to the site from 19th August 2004 to 30th August 2004 and one residence from 14th October 2004 to 21st October 2004 by ASK Consulting Engineers. The ambient noise level measurements were conducted using calibrated ARL EL215 Type 2 environmental noise level meters. The sampling period at each site was based on continuous 15-minute samples over the entire period.

The measured noise levels are summarised in **Table 7-1** below, in addition to the proposed night-time background noise levels.

Table 7-1 Predicted Mining Noise Levels

Location	Measured Noise Levels, db(A)			
	L _{Aeq} (24 hour)	LA90(16 hour) (Daytime: 6 am to 10 pm)	LA90(16 hour) (Night-time: 10 pm to 6 am)	Night-time Background Noise Level (Average of Quiet Periods)
Prejudice the protection of Homestead individuals right to privacy	55	32	30	24
Prejudice the protection of Homestead individuals right to privacy	55	37	30	27
Prejudice the protection of Homestead individuals right to privacy	59	34	29	27

The background monitoring results indicates:

The study area has relatively low background noise. The lowest noise levels were below the noise floor of the instrumentation and can not therefore be accurately measured;

- The ambient noise levels are below the LAeq(24 hours) 55 dB(A) criterion;
- The noise levels at the protection of Homestead show the influence of an existing mining operation and railway to the north;
- The noise levels at the protection of Homestead show the influence of the Peak Downs Highway to the south;
- The measured background noise levels are low at 23 to 37 dB(A) and typical of a rural environment with few noise generating activities;

Background noise levels around 27 to 30 dB(A) are around the noise floor (lower limit) of the monitoring equipment, which means that the actual background noise levels may be even less than 27 dB(A). Monitoring was conducted during winter and the noise levels are generally at their lowest during this period. During summer it is possible that insect noise would occur during various periods of the day and therefore result in higher background noise levels. The Australian Standard AS 1055.2:1997 entitled 'Acoustics - Description and Measurement of environmental Noise. Part 2: Application to Specific Situations' states for an estimated average background noise level for areas with negligible transportation is 30 dB(A) for night time hours.

A minimum night-time background noise level of 25 dB(A) has been adopted based on experience with similar rural sites and a daytime background noise level of 30 dB(A). Noise limits for noise sensitive places (residences) are outlined in **Table 7-2**.

Table 7-2 Proposed Noise Limits

Period of Day	Background Noise, dB(A)	Proposed Noise Limit, dB(A)	
		Excluding Background Noise (i.e. mining plant only)	Including Background
Day (6 am to 6 pm)	30	33	BG + 5dB(A) = 35
Evening (6 pm to 10 pm)	28	31	BG + 5dB(A) = 33
Night (10 pm to 6 am)	25	25	BG + 3dB(A) = 28

BG Background

7.1.2 Vibration

Baseline vibration monitoring has not been conducted, however based on experience in similar areas, would be expected to be in the order of 0.05 mm/s. Higher vibration levels will be experienced within close proximity of the existing railway when trains pass this location and near the Peak Downs Highway following heavy vehicle movement.

The vibration criteria for the project are based on the criteria outlined in the EPA Guideline 8 as follows:

Airblast overpressure	115 dB (linear peak) for nine (8) out of ten (10) consecutive blasts ≤ 120 dB ((linear peak) at any time.
Vibration Limits	5 mm/s peak particle velocity for nine (8) out of ten (10) consecutive blasts ≤ 10 mm/s peak particle velocity at any time.

7.2 POTENTIAL IMPACTS

The major noise and vibration sources at the proposed mine include:

- Rock drilling and blasting;
- large mobile equipment such as coal haulers, dump trucks, loaders and dozers;
- coal crushing equipment, conveyors and the rail siding facilities; and
- truck and shovel operations.

Modelling of noise impacts has been performed using the PEN 3D terrain model and assessed against the noise nuisance criteria at the three nearby residences under a range of climatic conditions. The modelling found:

- The noise from the rock drill meets the noise level goal at all residences during the daytime and is therefore acceptable during the daytime period (ie 7 am to 6 pm). The noise level goal is exceeded during the evening and night, under the adverse climatic scenarios modelled. Should rock drilling be required during this period, further investigation is recommended, in the form of a Noise Management Plan for Rock Drilling to include:
 - o climatic conditions for the intended drilling period;
 - o revised source data through noise measurement of site equipment;
 - o re-run predictions of potential impacts on sensitive receptors based on dot points 1 and 2 above; and
 - o develop mitigation strategies, as required, to minimise the potential for impact, such as rescheduling the activity (where possible), noise barriers or mitigation measures at the receiver through consultation with the landholder.

- The CHPP satisfies the noise criteria for all periods; and
- Rail noise from the rail loop is acceptable 24 hours per day.

Ground vibration levels are expected to be well below the 10 mm/s EP (Noise) Policy criterion and the 5 mm/s ANZECC (1990) guidelines criterion given the separation distance to sensitive places. Airblast overpressure levels are also expected to be less than the 115 dB (L) criterion of the *Environmental Protection Regulation 1998* and ANZECC (1990) guidelines. Ground vibration is not expected to impact on any underground services (plumbing *etc.*) at the residences surrounding the operation.

7.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES - NOISE	
Environmental Value	Existing noise and vibration levels at receptors (local residences).
Environmental Protection Objective	There will be no unlawful nuisance noise attributable to the mining activities at neighbouring noise sensitive places.
Performance Indicators/Criteria	No unlawful nuisance noise at these homesteads. Noise monitoring to be in accordance with the <i>Environmental Protection (Noise) Policy</i>
Control Strategies	In accordance with best practice industry standards, the following noise control measures are recommended: Noise <ul style="list-style-type: none"> • All equipment will be well maintained. • All mobile equipment to be fitted with the appropriate silencing equipment. • While rail shunting operations are not anticipated it should be avoided. • Prepare Noise Management Plan for Rock Drilling, should drilling be required during the night-time. Vibration <ul style="list-style-type: none"> • Blast design will ensure that all relevant airblast and ground vibration criteria are complied with at surrounding sensitive locations. • Blasting will only be carried out between 9 am to 7 pm. Where blasting is required outside of these times, appropriate consultation shall be undertaken with directly affected residents in advance of blasting and approval obtained from the EPA. Investigate any noise complaint expeditiously and respond to complainant.
Commitment 12	Noise monitoring carried out in response to complaints and will be undertaken in accordance with the requirements of the <i>Environmental Protection (Noise) Policy 1997</i> at the commencement of the operational phase of the Mine.
Commitment 13	Blasting will be restricted from 9 am to 7 pm, Where blasting may be required outside of these times, appropriate consultation shall be undertaken with directly affected residents in advance of blasting and approval obtained from the EPA.
Commitment 14	Noise monitoring locations will be detailed in the Plan of Operations

7.4 PROPOSED EA CONDITIONS

- (D1-1) Subject to Conditions (D1-2) and (D1-3) noise from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
- (D1-2) When requested by the administering authority, noise monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results be notified within 14 days to the administering authority following completion of monitoring.
- (D1-3) If the environmental authority holder can provide evidence through monitoring that the limits defined Schedule D - Table 1 and 2 inclusive, are not being exceeded then the holder is not in breach of Condition (D1-1). Monitoring must include:
- LA, max adj, T ; and
 - the level and frequency of occurrence of impulsive or tonal noise; and
 - atmospheric conditions including wind speed and direction; and
 - location, date and time of recording.
- (D4-1) If monitoring indicates exceedence of the limits in Schedule D - Table 1 and 2, then the environmental authority holder must:
- address the complaint including the use of appropriate dispute resolution if required; or
 - immediately implement noise abatement measures so that emissions of noise from the activity do not result in further environmental nuisance.

Schedule D- Table 1 Proposed Noise Limits

Period of Day	Proposed Noise Limit, dB(A)
Day (6 am to 6 pm)	Background + 5 dB(A)
Evening (6 pm to 10 pm)	Background + 5 dB(A)
Night (10 pm to 6 am)	Background + 3 dB(A)

- (D5-1) The method of measurement and reporting of noise levels must comply with the latest edition of the Environmental Protection Agency's Noise Measurement Manual.

Schedule D - Table 2 Airblast overpressure

Noise Parameter	At Noise Sensitive Place	
	Monday to Saturday 6 am – 7 pm	Sundays and public holidays
Airblast overpressure level (dB[Lin] Peak	115 dB (80 th percentile)	115 dB (80 th percentile)

- (D6-1) Subject to Conditions (D6-2) and (D6-3) vibration from the mining activity must not cause an environmental nuisance, at any sensitive or commercial place.
- (D6-2) When requested by the administering authority, vibration monitoring must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of the authorised officer) of environmental nuisance at any sensitive or commercial place, and the results must be notified within 14 days to the administering authority following completion of monitoring.
- (D6-3) If the environmental authority holder can provide evidence through monitoring that the limits defined in Schedule D - Table 3 are not being exceeded then the holder is not in breach of (D6-1). Monitoring must include:
- location of the blast(s) within the mining area (including which bench level); and
 - atmospheric conditions including temperature, relative humidity and wind speed and direction; and
 - location, date and time of recording.
- (D6-4) If monitoring indicates exceedence of the relevant limits in Schedule D - Table 3, then the environmental authority holder must:
- address the complaint including the use of appropriate dispute resolution if required; or
 - immediately implement vibration abatement measures so that vibration from the activity does not result in further environmental nuisance.

Schedule D - Table 3 Airblast overpressure

Noise Parameter	At Noise Sensitive Place	
	Monday to Saturday 6 am – 7 pm	Sundays and public holidays
Peak Particle Velocity (mm/s)	5 mm/s (80 th percentile)	5 mm/s (80 th percentile)

8 WASTE

8.1 ENVIRONMENTAL VALUES

Existing activities associated with grazing on the Isaac Plains site generate minimal general waste. The environmental and health impacts of the waste management practices known to be carried out are considered negligible.

8.2 POTENTIAL IMPACTS

The waste products expected to be generated by the Mine are:

- overburden material;
- sewerage;
- general wastes (domestic and construction wastes); and
- regulated wastes (e.g., tyres, batteries, waste oil, and used containers).

Sewerage will be treated in a packaged sewerage treatment plant. Dried sewerage sludge will be buried within spoil. Water from the sewage plant will be used as dust suppression on haul roads.

General wastes and agreed regulated wastes will be either disposed of on-site or transported off-site for disposal at Council facilities. Regulated wastes capable of being economically recycled (e.g., waste oil, light vehicle tyres, used batteries) will be sent to a licensed recycling facility.

Large tyres will be buried within spoil and their position recorded in three dimensions.

Given the nature of general and regulated waste streams generated on site, the impact on the air, water and land resources on site are not expected to be significant.

Any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the *Environmental Protection Act*.

The mine operation will have a fuel and lubricant facility. Initial estimates indicate the mine will require 3 x 55,000 L above ground diesel storage tanks, 2 x 20,000 L oil tanks and 3 x 10,000 L waste/low oil usage tanks. All petroleum product storage will be stored in bunded areas and sized to contain any spills in accordance with the relevant Australian Standards (AS 1940).

The bunding allows for minimal opportunity for spills to occur from the tanks themselves. Leaks from pipes can and does occur. To overcome this possibility, transfer pipes will be located above ground and inspected weekly and pressure tested annually. The risk of a major spill which could contaminate water, soils or groundwater is considered to be very low. Minor spills of between 10 and 200 litres can occur during refuelling, while spills of over 500 litres are rare. Soil contaminated by resulting hydrocarbons would be removed and placed in a 'regulated waste storage area'.

Hydraulic oil spills can occur in the operating pits as a result of burst hoses. These spills are also minor in size and generally fall onto coal or overburden. There is no opportunity for such spills to report to nearby water ways.

Hydrocarbon contaminated materials (oily rags, oil filters etc) and waste oil will be removed by a licensed regulated waste contractor.

All workshops and mobile refuelling trucks will be equipped with 'Spill Cleanup Equipment'.

Hydrocarbon management training will be provided to all staff working in areas where hydrocarbons are used on a daily basis such as the workshops and fleet vehicles. Hydrocarbon skimmers will be installed in workshop water sumps and will be cleaned and maintained on a regular basis.

Bunding of all hazardous goods (chemicals and hydrocarbons) storage areas will be in accordance with Australian Standards (AS1940). Temporary field storages will be banded, although appropriately sized earthen bunds may be used. Drums from 20 L to 205 L capacity will be placed within banded areas when not in use.

In conclusion, waste from mine activities will be managed to ensure there are no unacceptable environmental impacts and comply with EPA statutory requirements.

8.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES - WASTE	
Environmental Value	Wastes are managed to ensure no environmental harm is caused.
Environmental Protection Objective	Waste will be managed to avoid adverse impacts on the health of the Mine workforce and minimise risk of impact on land, air and water
Performance Indicators/Criteria	<p>Volume or mass of recycled materials.</p> <p>Temporary storage and final disposal of waste types in authorised locations.</p> <p>Implementation of overburden monitoring program.</p> <p>Stock excluded from waste storage/disposal areas.</p> <p>Presence of appropriate bins and containers.</p> <p>Presence of appropriate signage.</p> <p>Waste tracking requirements form <i>Environmental Protection (Waste Management) Regulation 2000</i>.</p> <p>Contamination of soils assessed against <i>Draft Guidelines for the Assessment & Management of Contaminated Land in Queensland</i>.</p>
Control Strategies	<p>Wastes will be classified and segregated at source to facilitate waste management.</p> <p>General waste will be either removed from site and disposed of at the Shire dump or disposed of in a licensed landfill on site.</p> <p>Regulated waste (including waste oil but excluding sewerage sludge) will be removed from site by licensed regulated waste transport contractor for recycling by licensed recycler or disposal in a licensed regulated waste disposal facility</p> <p>Large tyres from earthmoving equipment will be disposed of on site within spoil.</p> <p>Sewerage will be treated in a Sewerage Treatment Plant (refer to Water Management commitments).</p> <p>Sewerage sludge will be dried and then disposed of within spoil.</p> <p>Where possible and practical, vegetation waste from clearing will be respread on rehabilitated areas. Vegetation waste will only be burnt as a last resort, and only if there is minimal risk of causing nuisance to neighbouring residences.</p> <p>Any sites that become contaminated will be investigated and managed in accordance with the requirements of the contaminated land provisions of the <i>Environmental Protection Act</i>.</p> <p>Manage waste streams by: identifying, categorising and quantifying waste types; identifying methods for waste avoidance, minimisation, recycling, treatment and disposal.</p> <p>Install containers and other facilities for receipt of various waste types. Install appropriate instructional and warning signage.</p> <p>Prepare standard procedures for the storage, containment, disposal and spill response for potentially hazardous materials.</p>
Commitment 15	A register of all chemicals stored on site will be developed and maintained.
Commitment 16	The storage and handling of flammable and combustible liquids will be in accordance with <i>AS 1940 - Storage and Handling of Flammable and Combustible Liquids</i> .
Commitment 17	Develop and implement a Waste Management Plan.

8.4 PROPOSED EA CONDITIONS

- (E1-1) Tyres stored awaiting disposal or transport for take-back and, recycling, or waste-to-energy options should be stockpiled in volumes less than 3m in height and 200m² in area and at least 10m from any other tyre storage area.
- (E1-2) All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.
- (E2-1) Where practicable, scrap tyres resulting from the mining activities can be disposed of in underground stopes provided this practice does not cause an unacceptable fire risk or compromise mine safety.
- (E2-2) Disposing of scrap tyres resulting from the mining activities in spoil emplacements is acceptable, provided tyres are placed as deep in the spoil as reasonably practicable.
- (E2-3) Scrap tyres resulting from the mining activities disposed within the operational land must not impede saturated aquifers or compromise the stability of the consolidated landform.
- (E3-1) Regulated waste must only be removed from the licensed place by a person licensed under the *Environmental Protection Act 1994* to transport the waste.
- (E3-2) Regulated waste must only be removed to a facility licensed under the *Environmental Protection Act 1994* to receive such waste.

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9 LAND

9.1 ENVIRONMENTAL VALUES

9.1.1 Topography

The topography of the area is described within the Harrybrandt 1:100 000 scale Topographic Map (*Harrybrandt 1:100 000 scale, sheet 8554, Topographic Map, Department of Minerals and Energy, Division of National Mapping, 1973*).

Elevation of the catchment varies between 200m AHD and 300m AHD. The site drains from the northeast to southwest towards Isaac River. Smoky Creek flows through the centre of the mining lease and the Unnamed Watercourse traverses near the southern boundary of the mining lease.

The general slope of land beneath the footprint of the mine averages between 2% and 3%. Steeper slopes occur within the watercourses and in the undisturbed remnant hills to the east and west of the open cut pits. The rail loop traverses around a small mesa to about 280 m AHD in height.

9.1.2 Geology

The Isaac Plains deposit area is located in the northern part of the Permo-Triassic Bowen Basin containing principally fluvial and some marine sediments. The Bowen Basin is part of a connected group of Permo-Triassic basins in eastern Australia which includes the Sydney and Gunnedah Basins. The axis orientation of the Basin is NNW-SSE roughly parallel to the Paleozoic continental margin. Tectonically, the basin can be divided into NNW-SSE trending platforms or shelves separated by sedimentary troughs. The units from west to east are the Springsure Shelf, Denison Trough, Collinsville Shelf/Comet Platform, Taroom Trough, Connors and Auburn Arches (interrupted by the Gogango Overfolded Zone) and the Marlborough Trough. Development of the basin in the Early Permian was in the form of half grabens which subsequently became areas of regional crustal sag. Variations in depositional patterns and deformation styles occur along strike suggesting the possibility of NE trending deep seated crustal transfer faults referred to as transfer corridor by Hammond (1987).

The basin has suffered NE-SW oriented extensional and compressional events.

Structurally, the deposit lies on the western boundary of the deformed Nebo Synclinorium immediately west of a regional thrust fault system - the Burton Range Thrust. To the east (of the thrust) seams are repeated in the Wotonga and Morambah deposits. Further to the west is the structurally simple Collinsville Shelf.

The economic seams are contained in the Late Permian Rangal Coal Measures which are approximately 100m thick. The Rangal Coal Measures are underlain by the Fort Cooper Coal Measures and overlain by the Late Permian to Early Triassic Rewan Group. **Table 9-1** details the regional stratigraphy of the North Bowen Basin.

Table 9-1 Permian – Triassic Stratigraphy of the North Bowen Basin

Jensen (1975) Koppe (1978) Staines & Koppe (1980)		
	Moolayember Formation	
Clematis Group	Expedition Sandstone Glenidal Formation	
Rewan Group	Arcadia Formation Sagittarius Sandstone	
Blackwater Group	Rangal Coal Measures Fort Cooper Coal Measures Moranbah Coal Measures	
Back Creek Group	Exmor Formation	German Creek Formation
	Blenheim Formation Gebbie Formation Tiverton Formation	Maria Formation Undiff, Back Creek Group

The Rangal Coal Measures comprise light grey, cross bedded, fine to medium grained labile sandstones, grey siltstones, mudstones and coal seams. Cemented sections are common in the sandstones. The transition from the Rangal Coal Measures to the Rewan Formation is generally difficult to define and is often based on the change from the green-grey colour of the Rewan sandstones to the blue-grey colour of the Rangal sandstones. The transition between the formations is 15 to 60m above the first major seam in the Rangal Coal Measures the Leichhardt Seam.

The Fort Cooper Coal Measures comprise typically tuffaceous sandstones, siltstones, mudstones and coal seams. The transition between the Rangal Coal Measures and the Fort Cooper Coal Measures is generally clearly marked by the Yarrabee Tuff - a basin-wide marker bed comprised of weak, brown tuffaceous claystone.

9.1.3 Overburden

Overburden is the term given to material overlying the coal seam and below the topsoil which is removed during open cut mining to allow coal extraction.

The overburden at Isaac Plains has been characterised by Geo-Environmental Management. The objectives of this study were to:

- Determine the acid forming potential of the overburden and coal rejects, and evaluate the salinity, sodicity and ARD risks associated with the project.
- Determine the chemical composition of the overburden and coal rejects, and their water extracts in order to identify any toxic element concerns for revegetation and water resources.
- Identify the potential geochemical implications for overburden and coal reject disposal, and mine operations and provide preliminary recommendations for environmental management.

Overburden

The results of the geochemical test work indicates that overburden at Isaac Plains will be non-acid forming (NAF) with a low S content ($<0.1\%S$) and moderate neutralising capacity (average ANC of 33 kg H_2SO_4/t). Therefore these materials are not expected to present an acid rock drainage (ARD) risk. Additionally, the samples tested indicate that these materials only have low to slight salinity and therefore saline conditions or salt release are not expected to be a concern for water quality or revegetation.

The samples tested indicate that the overburden is moderately sodic and therefore likely to be slightly dispersive. However, if the untreated overburden is left exposed to rainfall and erosion for long periods of time these dispersion characteristics may increase to a point where problems with stability, erosion and revegetation are encountered.

Elemental scans performed on selected mine rock samples indicate that the overburden contains relatively high concentrations of metals Arsenic (As), Antimony (Sb) and Selenium (Se). Of these, only Se is likely to be relatively soluble. Cobalt (Co) and Molybdenum (Mo) were also found to be relatively soluble, however, these elements were not found to occur in high concentrations in the overburden.

Coal Rejects

Coarse coal rejects have a low S content ranging from 0.11 to 0.36 %S and fine samples are comparatively higher ranging from 0.27 to 1.44 %S. Coarse rejects are considered NAF, however fine rejects are considered potential acid forming (PAF).

The samples tested indicate relatively high concentrations of a number of environmentally sensitive metals occurring in the coal rejects, however only as and se were found to be readily soluble. Any increase in pH may increase the solubility of these and potentially other environmentally sensitive metals.

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9.1.4 Soils

A soil survey on the site was undertaken by GT Environmental. Soil types vary from deep uniform clays, sandy duplex to recent alluvia. A summary of soil types and their topsoil characteristics is provided in **Table 9-2** and illustrated by **Figure 9-1**.

Table 9-2 Isaac Plains Soil Types and Topsoil Characteristics

Soil Type	Description	Topsoil Characteristics
A1	Alluvial deep sandy duplex	<p>The alluvial nature contributes to these soils being generally lighter textured (i.e., sandier), and higher fertility. They are well suited to rehabilitation but the maximum recommended strip depth is 30 cm to avoid inclusion of the harder, denser structured subsoils. The previous section indicates that salinity is not an area of concern and general fertility is acceptable.</p> <p>Useable soil depth may vary up to 50 cms in the deep sandy alluvia. These soils are not suited to application on sloping sites due to a high erosion potential. These sandy soils readily germinate and support both grasses and native trees.</p>
A2	Alluvial thin duplex with hard subsoils	
B1	Well structured red/brown non-cracking clays.	<p>These soils occur north of Smoky Creek and are excellent quality topsoil due to well balanced fertility, lighter, sandy clay texture and other attributes which will assist rapid establishment of small pasture or tree seed. The overall recommended strip depth is 20 cm (up to a maximum of 30 cm) as the soil below this depth is quite hard and coarse structured with increasing probability of salinity. The soils are suitable for application in all areas of rehabilitation, however should be preferentially used on sloping sites due to higher erosion resistance compared to A1 and A2 soils.</p>
B1v	Variant of B1 with linear gilgai	
B2	Thin red duplex soils with well structured subsoils.	
E1	Poplar Box sandy duplex	<p>Soils in this group have reduced suitability for reuse in rehabilitation from poor structural and physical characteristics and are more likely to be saline and sodic.</p> <p>The gravely non-cracking clay and sandy texture contrast soils which predominate south of Smoky Creek are the least preferred soil in the survey area. They have quite hard, massively structured B-horizons with inhibited drainage (evidenced by mottling and occasional bleach layers at the base of the sandy A-horizon). The subsoil below this bleach should not be stripped. The sandy A-horizon is useable but may tend to set hard in rehabilitation. Its preferred use would be on the flatter rehabilitation areas less prone to erosion. The topsoil is poorer in terms of fertility but is suitable to a maximum average stripping depth of 15 cm.</p>
B3	Crusting, gravely sandy clays associated with scree slopes	
B4	Melan-holed clay Brigalow lowlands	
B5	Hard setting, gravely uniform brown clay with very hard coarse subsoils	
R1	Very shallow gravely loamy sands to sandy clay loams with extensive outcropping rock.	

9.1.5 Landuse and Suitability

The project area is suited to grazing at varying stocking rates with no indication of cultivation for grain crops having been undertaken. Most of the project area has undergone recent pasture improvement by vegetation regrowth control which includes blade ploughing and chaining. The area was originally vegetated with mixed Brigalow communities and Poplar Box woodlands but has been almost completely cleared for grazing purposes.

Isolated remnant areas of original scrub remain but are in the minority. At the time of the fieldwork, the lands within the project area were in a very dry condition and being grazed by beef cattle.

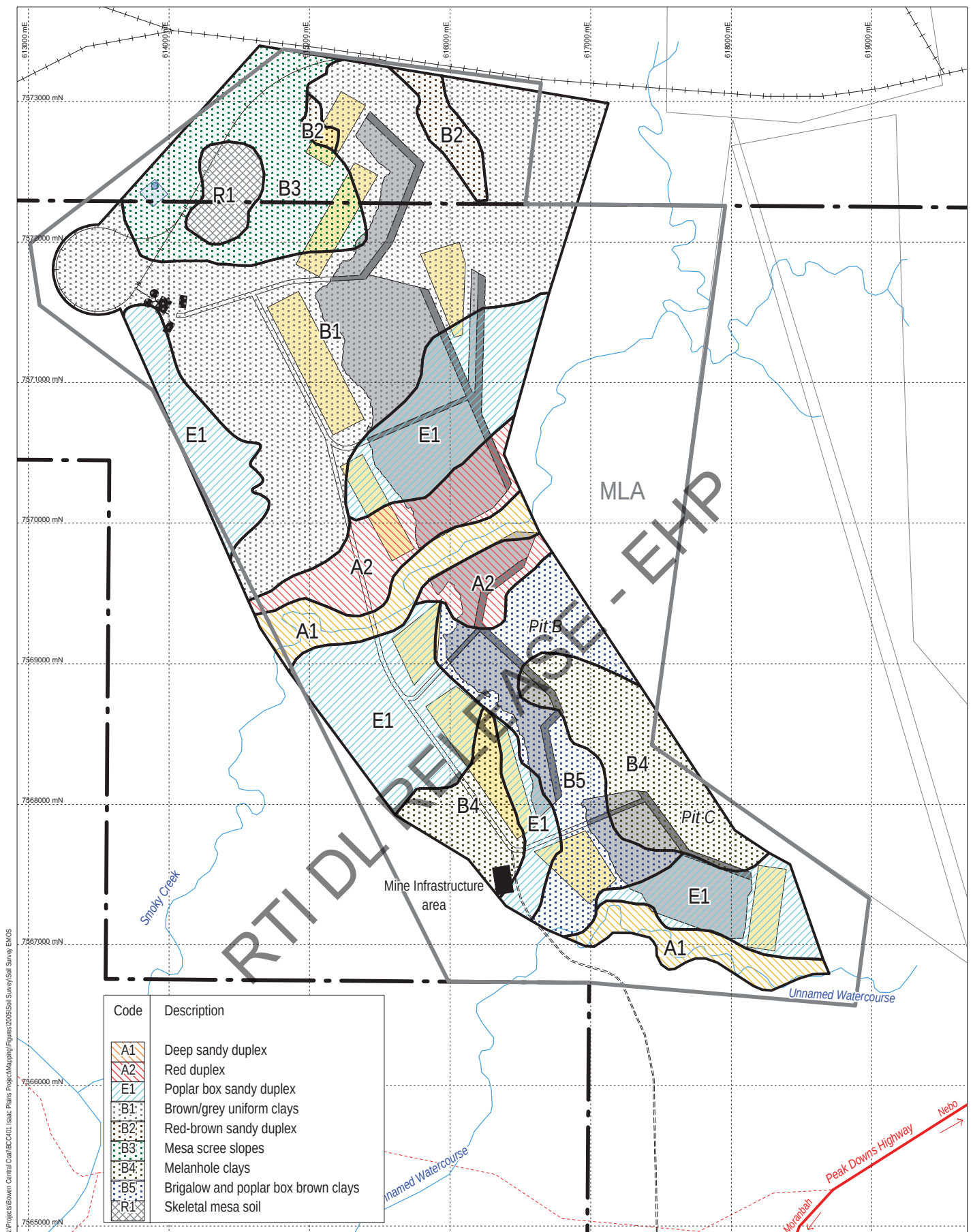
The relative suitability for beef cattle grazing as well as dryland cropping has been determined. Grazing of native and improved pastures by beef cattle has remained the dominant land use since agricultural development of the district. Cropping has not been practiced due to generally significant moisture, workability and fertility limitations.

The major limiting factors determining crop and grazing suitability class include plant available moisture (m), nutrient deficiency (n), soil physical factors (p), erosion (e) workability (k) and susceptibility to flooding (f).

Table 9-3 Land Suitability Classification (Shields and Williams, 1991 and DME, 1995)

Class 1	Suitable land with negligible limitations and is highly productive requiring only simple management practices.
Class 2	Suitable land with minor limitations which either reduce production or require more than simple management practices to sustain the use.
Class 3	Suitable land with moderate limitations – Land which is moderately suited to a proposed use but which requires significant inputs to ensure sustainable use.
Class 4	Marginal lands with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long term.
Class 5	Unsuitable land with extreme limitations that precludes its use.

Land suitability criteria are outlined in **Table 9-3**. The mapped pre-mining land capability for Isaac Plains is illustrated in **Figure 9-2**.



Legend

- EPC 755 boundary
- ~ Drainage
- ▭ MLA boundary
- - - Access road
- == Haul road
- Infrastructure
- ▭ Boxcut
- ▭ Pit
- ▭ Internal spoil

Bowen Central Coal Management Pty Ltd Isaac Plains Project Soil Survey

Datum: ADG 84
Projection: TM, zone 55

0 1 2
kilometres

FIGURE 9-1

9.2 POTENTIAL IMPACTS

9.2.1 Topography

The open cut mining operations have a significant impact on the topography of the area, attributed to the overburden spoil heaps and final voids. The spoil heaps, after controlled placement, will appear as a gently undulating plateau of unconsolidated soil and rock, on what was previously predominantly undulating lowland plains and gently sloping crestal areas. Spoil heaps are likely to be in the order of 30 m above natural ground level as a consequence of the swell factor of 30%.

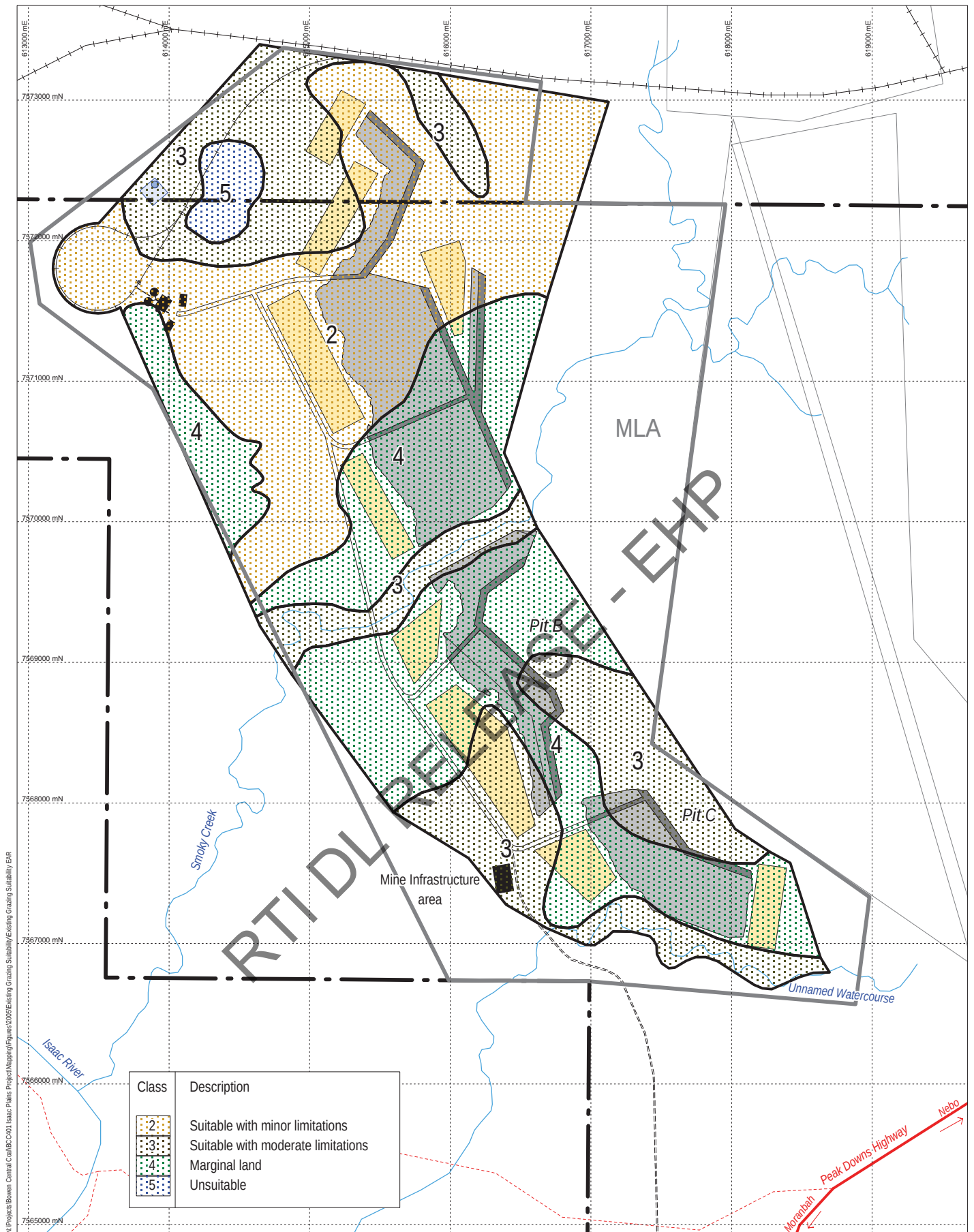
9.2.2 Overburden

Physical disruption of the materials during the mining process changes the nature of the overburden materials and their interaction with the surrounding environment in a number of ways. These include:

- Exposure of unweathered material to oxidation processes near the post-mining landform surface can result in the release of oxidation products (e.g. salts and potentially acid) which are prone to transport by surface runoff or infiltration.
- Materials 'swell' by approximately 30% when mined (i.e. overburden or 'spoil' in a dump has a volume approximately 1.3 times that of its in situ or unmined volume). As a result, spoil cannot be contained within the mined excavation leading inevitably to slopes different to those originally present. The post-mining material will also have a higher initial porosity than the original in situ overburden. Some residual settlement is expected, but this will have little effect on the final landform. Historical evidence from open cut coal mines in the Bowen Basin indicates that instability does not largely exist on spoil dumps.
- Return of a vegetation growth media to the surface of a landform that is different to that which was present near the surface prior to mining, can alter the capability of original vegetation communities to re-establish.
- Overburden returned to the surface will have a poorer nutrient status, lower organic matter content and poorer structure compared to the soil hosting original vegetation communities. Poorly structured and potentially dispersible materials may be prone to erosion, particularly on slopes.

As discussed in **Section 9.1.3**, overburden does not present an ARD or salinity risk. Coal rejects are considered potential acid forming (PAF). Coal rejects will be alkali blended (or co-disposed) with overburden material, which has a high buffering capacity and encapsulated/covered at depth within spoil dumps to reduce the risk of ARD.

Overburden material is moderately sodic and therefore slightly dispersive. Further investigation of the sodic properties of overburden material should be undertaken through the Plan of Operations. Sodic spoil will require a cover of 1 m using non-sodic soils.



Legend

- EPC 755 boundary
- ~ Drainage
- ▭ MLA boundary
- - - Access road
- == Haul road
- Infrastructure

- Boxcut
- Pit
- Internal spoil

Bowen Central Coal Management Pty Ltd

Isaac Plains Project

Existing Grazing Suitability

Datum: ADG 84
Projection: TM, zone 55

0 1 2
kilometres

FIGURE 9-2

9.2.3 Soils

Most of the survey area is planned to be disturbed by open-cut mining and will require stripping of topsoil for reuse in the rehabilitation program.

The area north of Smoky Creek (not including the E1 unit) represents the best opportunity for stockpiles of good quality topsoil. South of that point soils are much harder and less suited for mine-site rehabilitation.

Alluvial Soil Types (A1 and A2) are well suited to rehabilitation but the maximum recommended strip depth is 30 cm to avoid inclusion of the harder, denser structured subsoils. These soils are not suited to application on sloping sites due to a high erosion potential. These sandy soils readily germinate and support both grasses and native trees.

B1 and B2 soils are excellent quality topsoil due to well balanced fertility, lighter, sandy clay texture and other attributes which will assist rapid establishment of small pasture or tree seed. The overall recommended strip depth is 20 cm to 30cm. These soils are suitable for application in all areas of rehabilitation, however should be preferentially used on sloping sites due to higher erosion resistance compared to A1 and A2 soils.

E1, B3, B4 and B5 soils have reduced suitability for reuse in rehabilitation from poor structural and physical characteristics and are more likely to be saline and sodic. The sandy A-horizon is useable but may tend to set hard in rehabilitation. Its preferred use would be on the flatter rehabilitation areas less prone to erosion. The topsoil is poorer in terms of fertility but is suitable to a maximum average stripping depth of 15 cm.

The survey area is bisected by Smoky Creek which forms a clear soils boundary between better quality scrub soils to the north (B1 and B2) and the harder, coarser structured soils to the south (B4, B5 and B6). The principle soil types are non cracking sandy clay Brigalow gently undulating plains together with sandy duplex Poplar Box woodlands (E1). Hard sandy duplex alluvia with mixed Poplar Box woodland (A1 and A2) occur in association with two creek lines in the area.

Topsoil stripping, stockpiling and replacement on rehabilitation areas will be undertaken using a variety of heavy equipment including scrapers, dozers, loaders, excavators and trucks. During these operations, topsoil can be deleteriously affected through compaction, stockpile depth, prolonged periods of stockpiling, mixing, weed infestation on stockpiles and stockpile erosion.

Compaction from heavy equipment occurs during all phases of the topsoil stripping, stockpiling and replacement operation. Disruption of soil physical structure may lead to hardsetting, crusting, a reduction in soil porosity/infiltration, increased runoff and erosion and root impedance. Stockpile heights should be kept to a minimum to minimize compaction of topsoil and sterilisation of soil biological activity.

9.2.4 Land Use & Suitability

9.2.4.1 Post Mining Land Use Considerations

The suitability of the waste rock dumps for cropping and grazing is constrained by slope angle, the nature of soil cover, and altered moisture profile. These constraints would increase the risk of erosion significantly if cropping or grazing were undertaken.

The erosional stability of the waste dump plateau may also be compromised by grazing. It is also isolated from other pastures and suitable watering points and therefore is not considered suitable for sustained grazing.

No areas are considered suitable for rainfed cropping.

The sustainability of grazing as a land use on mine rehabilitation areas remains to be demonstrated and no definitive standards exist. In grazing trials conducted at BMA Blackwater and Norwich Park Mines, results have led to proposals for limitation levels for grazing which are fundamentally based on slope gradient. Only lands <11% are considered as realistic grazing lands in this report. Mine rehabilitation areas which exceed this level include various waste rock dump areas including their margins, ramps and final voids and are unlikely to sustain this use unless considerable regrading effort is undertaken.

Many open-cut mines in the Bowen Basin have a stated aim of native bushland use/suitability at completion of rehabilitation after mining has ceased. This is a fundamentally conservative end-use which given the climatic limitations in the region is the preferred use of the site. A higher use such as grazing is feasible, but will require the implementation of a very conservative landform design involving the formation of slopes generally less than 11%, and or rock lining of batters of pre-strip dumps as well as a probable ongoing higher maintenance costs compared to surrounding lands. The proposed batters for spoil dumps exceed 11 %, and therefore grazing will not be possible.

Other impacts on land suitability could potentially result from disturbance of land for construction of infrastructure. Depending on the type of infrastructure, the impact will range from grading topsoil for tracks to placing road base for major haul roads, leveling and compacting hardstand areas and cut and fill operations for dam walls.

Depending on the requirements of the next land user, dams, roads and drains will remain after mining to provide beneficial infrastructure for post-mining landuse. Some buildings may also remain at the end of mine life.

Pits and ramps not back-filled will be left as final voids and made safe with persons and stock excluded. Dam structures constructed for pit de-watering purposes and to collect run off will remain after the mining operation is finished and could be used as farm dams depending on final water quality.

Visual impacts of the Mine will be minimised by progressive rehabilitation of overburden dumps and the revegetation of topsoil stockpiles and dam walls.

9.2.4.2 Rehabilitation Design

Impacts on land use suitability result largely from the dumping of overburden in spoil heaps during the mining process. The majority of overburden will be backfilled into mined out pits. Some overburden will be placed in out-of-pit spoil dumps (i.e. box-cut spoil), reshaped and re-covered with previously stockpiled topsoil and rehabilitated.

Erosion may result from elevated slope angles and the placement of potentially dispersible material. The main effects of erosion that are relevant to mine rehabilitation are:

- Pollution of downstream areas with sediment and elevated salinity loads;
- Loss of materials beneficial to plant growth (i.e. soil and nutrients); and
- Landform instability.

To limit erosion potential of the landform, the slope length should be reduced as the slope angle is increased unless additional erosion control measures are incorporated (eg diversion banks, overfall structures and chutes, lining, and pipe drops) so that acceptable slope criteria can be adopted in the design of the landform. Recommended slope lengths and contour intervals (with no specific erosion control) are provided in **Table 9-4**.

Table 9-4 Landform Design Criteria

Slope %	Slope °	Vertical Height	Maximum Slope Length Between Contour Banks
20	11.0	10	50
15	8.5	20	130
10	5.5	22	220
5	3.0	26	520
3	1.5	28	900

It is not planned to backfill the voids at the proposed Isaac Plains mine.

The proposed rehabilitation strategy consists of the following:

- External slopes for out-of-pit spoil dumps should be battered at 1(V):6(H) slope (16.7% or 10°). Provide a contour bank approximately half way along the batter to reduce slope length;
- The low wall should remain in its 'as dumped' position (usually 36°/73%). Regrading of the low wall will only occur if it is geotechnically unstable in its 'as dumped' form;
- The high wall should remain as is in a geotechnically stable form. Geotechnical investigations undertaken indicate a stable batter of 70° (275%);
- Seal the seam in final voids using pre-strip, if available;
- Existing ramps accessing the voids will remain with the sides benched to allow rehabilitation;
- Because the operation involves truck and shovel, spoil can be placed relatively uniformly. The surface of in-pit spoil disposal should be graded to create natural habitat through gentle undulations and encourage small ponding;
- Design and install perimeter stormwater diversion; and
- Fence the perimeter to restrict access.

An indicative rehabilitation design cross section and plan view are illustrated by **Figure 9-5**.

The post mine land use for areas disturbed by mining at Isaac Plains will be returned to a 'self sustaining vegetation community' using appropriate native tree, shrub and grass species based on site specific trials. The rehabilitated mine areas will aim to be complementary to nearby existing remnant vegetation. Areas not disturbed by mining could be returned to the pre-mine land use, 'grazing' as long as the rehabilitated spoil areas are fenced off from cattle.

The criteria for achieving the self-sustaining vegetation community will be developed during the operation as part of a rehabilitation trial, monitoring and research program.

The rehabilitation trial, monitoring and research program should ensure that:

- landform designs are stable with acceptable levels of erosion to protect downstream water quality;
- site-specific revegetation techniques are developed enabling the establishment of a self-sustaining vegetative cover;
- the rehabilitated areas are suitable for local flora and fauna colonisation; and
- Suitable monitoring techniques for erosion, nutrient status and vegetation establishment are adopted.

The results of rehabilitation trials undertaken on available overburden may be used to determine landform stability criteria and rehabilitation success criteria. The research will also draw on work done on other Bowen Basin mines. However, the use of site-specific research is considered essential in establishing local success criteria given variation in soils, overburden, climate and flora. Once developed, these criteria and proposed monitoring methods will be incorporated into the Plan of Operations.

9.2.4.3 Post Mining Landuse

Factors influencing changes in land suitability include;

- Changed physical, chemical and biological properties of soil;
- Changes in slope and slope length; and
- Changes in soil depth.

The pit area including internal and external spoil, ramps and final voids will be left as native bushland, as per the majority of mining operations in the Bowen Basin. The land capability for bushland where grazing will be restricted is Class 5 'unsuitable'.

The over-riding principles for the rehabilitation program at Isaac Plains are that the land should be returned to the agreed post mine land use and that it should be stable, self-sustaining and maintenance free.

Currently, the site is used for cattle grazing. For safety reasons, it is most likely that the mining lease area will be fenced off to exclude grazing during the mine life with the possible exception of some undisturbed areas (yet to be determined) depending on the mining schedule. Some areas will be available for grazing post mining as shown on **Figure 9-4**. BCC will minimise the downgrading of agricultural land suitability where possible. However, the preferred post-mine land use is not agriculturally-based land use. Therefore, it is not reasonable to expect the return of Class 3 land over the mine site. The post mine-land's suitability and management would be best defined in terms of ecosystem conservation objectives.

The post-mining land suitability was assessed using the same limiting factors used in the pre-mining land suitability assessment.

Comparison of pre and post mining land capability is presented in **Table 9-5** below and illustrated by graph in **Figure 9-3**.

Table 9-5 Pre Mining Land Capability Compared to Post Mining

Class	Pre-mining		Post-mining	
	Area (ha)	% Total Area	Area (ha)	% Total Area
1	0.0	0	0.0	0
2	546.4	33	239.2	15
3	466.3	28	446.4	27
4	600.1	37	288.2	18
5	28.4	2	666.8	41
Total	1641	100	1641	100

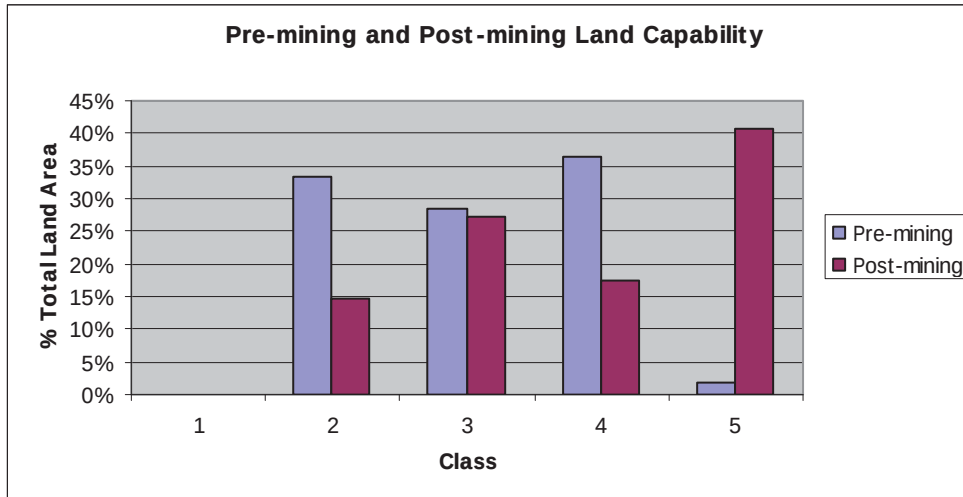
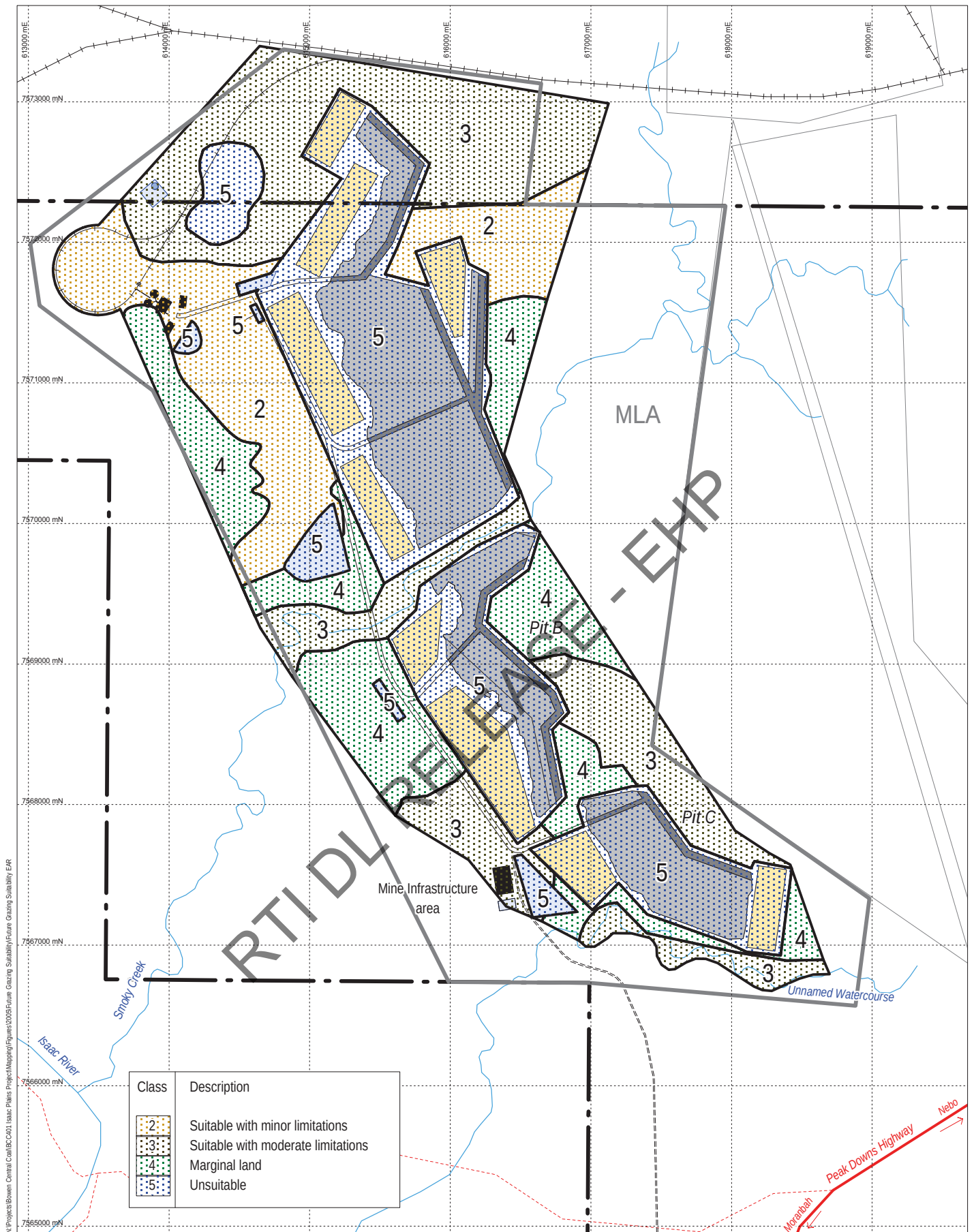


Figure 9-3 Pre-Mining Compared to Post-Mining Percentage Land Area

In conclusion, comparison of pre and post mine land capability indicates that the Isaac Plains mine pits and out-of-pit spoil dumps will change the current land capability to native ecosystem, which differs from the existing land use of grazing. However, this is balanced with the plan to rehabilitate mined areas to be complementary with native vegetation in the area.

Figure 9-4 shows the post-mining land suitability classes assigned across the mining lease.

RTI DL RELEASE - EHP



Legend

- EPC 755 boundary
- ~ Drainage
- ▭ MLA boundary
- - - Access road
- == Haul road
- Infrastructure

- Boxcut
- Pit
- Internal spoil

Bowen Central Coal Management Pty Ltd Isaac Plains Project Future Grazing Suitability

Datum: ADG 84
Projection: TM, zone 55

0 1 2
kilometres

FIGURE 9-4



Conceptual Rehabilitation Design

Bowen Central Coal Management Pty Ltd
Isaac Plain Project
Figure 9-5

9.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION OBJECTIVES & STRATEGIES – NATURE CONSERVATION	
Environmental Value	Existing soils and land capability, and areas supporting sensitive or protected ecological communities.
Environmental Protection Objective	<p>Return disturbed land to a self-sustaining native species vegetation cover which is suitable for flora and fauna colonisation.</p> <p>Ensure post-mining landforms are stable so that the agreed post-mining land use is not compromised</p>
Performance Indicators/Criteria	<p>Implementation of research program to determine landform design criteria.</p> <p>Implementation of research program to determine landform stability criteria.</p> <p>Implementation of research program to determine rehabilitation success criteria.</p> <p>Area of progressive rehabilitation set out in Plan of Operations</p> <p>Implementation of research program results with respect to landform design, landform stability and rehabilitation success criteria.</p> <p>Achievement of defined targets for area of progressive rehabilitation set out in Plan of Operations.</p> <p>Rehabilitation will commence within 18 months of land being excluded from future mining development.</p> <p>Interim landform design criteria pending completion of research programs: maximum external slope of 16%; graded banks installed.</p> <p>Sodic spoil should be covered with a minimum of 1 m of non-sodic soils.</p> <p>Sodic spoil is defined as having an Exchangeable Sodium Percentage > 20%.</p>
Control Strategies	<p>Determine appropriate landform design (slope, angle, slope length) using on-site research program and relevant data from other mines.</p> <p>Determine appropriate landform stability criteria using on-site research program and relevant data from other mines.</p> <p>Determine appropriate species mix of native trees, shrubs and grasses for revegetation and determine rehabilitation success criteria using on-site research program and relevant data from other mines. The program will include investigations into vegetation productivity, diversity, and soil fertility.</p> <p>Ensure the selection and establishment of plants are complementary to nearby remnant vegetation as part of Plan of Operations.</p> <p>Implement results of research programs.</p> <p>A-horizon topsoil to be salvaged for rehabilitation. Topsoil stockpiles to be mapped and volume recorded. Revegetate topsoil stockpiles.</p> <p>Respread topsoil on re-contoured spoil. Contour rip spoil to > 0.5m.</p> <p>Install graded banks on re-contoured spoil to minimise erosion.</p> <p>Monitor rehabilitation and carry out maintenance where required to achieve rehabilitation success criteria.</p> <p>Detail rehabilitation schedule and rehabilitation plans in the Plan of Operations.</p> <p>Detail environmental controls for exploration.</p> <p>Final voids, including pits and ramps not backfilled, will be made safe and persons and stock excluded.</p> <p>Develop a Topsoil Management Plan.</p>
Commitment 18	Disturbed land will be progressively rehabilitated. The rate and areas for rehabilitation will be detailed in the Plan of Operations.
Commitment 19	<p>Investigations and progressive reporting will be undertaken on:</p> <ul style="list-style-type: none"> landform design criteria including slope length, angles and drainage structures and drainage patterns; landform stability criteria; appropriate rehabilitation monitoring and maintenance requirements; rehabilitation success criteria; revegetation on-site using native trees, grasses and shrubs; within 5 years of overburden removal commencing depending on availability for rehabilitation.

ENVIRONMENTAL PROTECTION OBJECTIVES & STRATEGIES – NATURE CONSERVATION	
Commitment 20	An overburden monitoring program will be developed to test for EC, pH, and ESP in order to identify problematic material.
Commitment 21	All disturbed areas will be rehabilitated to a final land use that contains habitat for native flora and fauna.
Commitment 22	A topsoil inventory which identifies the topsoil requirements for the Mine and the availability of suitable topsoil on site will be detailed in the Plan of Operations.
Commitment 23	Topsoil will be stripped ahead of any areas where the topsoil resource would otherwise be lost or permanently destroyed and stored if not able to be immediately used.
Commitment 24	Topsoil that is stockpiled for greater than six months will be managed to minimise erosion.

9.4 PROPOSED EA CONDITIONS

(F1-1) All areas significantly disturbed by mining activities must be rehabilitated to a stable landform with a self-sustaining vegetation cover in accordance with Schedule F – Table 1 and 2.

Schedule F - Table 1 (Final Land Use and Rehabilitation Approval Schedule)

	Disturbance Type					
	Residual Void(s)	Waste Rock Dump(s)	Sediment/Supply Dams	Infrastructure	ROM Area	Roads and tracks
Tenure ID						
Projected surface area (ha)¹	42	414	35	3ha	8	28
Map Reference	Figure 6	Figure 6	Figure 6	Figure 6	Figure 6	Figure 6
Pre-mine land use	Class 2/3/4	Class 2/3/4	Class 2/3/4	Class 3	Class 2/4	Class 2/3/4
Post mine land use	Water storage	Native Ecosystem	Water storage	Grazing	Grazing	Return to grazing or remain as farm access track, depending on landholder requirements.
Post mine land capability	Class 5	Class 5	Class 5	Class 3	Class 2/4	Class 3/5.
Projected cover range (%)	NA	70%	NA	70%	70%	NA

¹ Estimates based on conceptual mine plan.

(F1-2) Progressive rehabilitation must commence when areas become available within the operational land.

(F1-3) Complete an investigation into rehabilitation of disturbed areas and submit a report to the administering authority proposing acceptance criteria to meet the outcomes in Schedule F - Table 1 and landform design criteria in Schedule F – Table 2.

Schedule F - Table 2 (Landform Design)

Disturbance Type	MAXIMUM SLOPE RANGE (%)	PROJECTED SURFACE AREA (HA) ¹
Waste Rock Dump – external slope	15% (8.5 °)	150
Waste Rock Dump – low wall	33% (18 °)	92
Boxcut batter	100% (45 °)	17

¹ Estimates based on conceptual mine plan.

(F2-1) Residual voids must comply with the following outcomes:

- residual voids must not cause any serious environmental harm to land, surface waters or any recognised groundwater aquifer, other than the environmental harm constituted by the existence of the residual void itself and subject to any other condition within this environmental authority; and
- residual voids must comply with Schedule F - Table 3.

Schedule F - Table 3 (Residual Void Design)

Void Identification	VOID WALL – COMPETENT ROCK SLOPE (%)	VOID WALL – INCOMPETENT ROCK SLOPE (%)	VOID MAXIMUM SURFACE AREA ¹
Pit A	275% (70 °)	73% (36 °)	23
Pit B	275% (70 °)	73% (36 °)	12
Pit C	275% (70 °)	73% (36 °)	7

¹ Estimates based on conceptual mine plan.

(F3-1) All infrastructure, constructed by or for the environmental authority holder during the mining activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land owner / holder.

10 NATURE CONSERVATION

10.1 ENVIRONMENTAL VALUES

A flora and fauna investigation was undertaken by Ecotone Environmental Services (EES). The investigation found that only a small proportion of the study area supports remnant vegetation as defined under the *Vegetation Management Act 1999*, and as a result of impacts from cattle grazing the vegetation is in poor-moderate condition. Validation of Regional Ecosystem mapping revealed a number of anomalies with the existing Queensland Herbarium (Version 4.0) mapping including incorrect mapping of *endangered* and *of concern* Regional Ecosystem polygons. No *endangered* RE's were found to occur in the study area; however small areas of *concern* RE's were identified in the riparian corridor along Smoky Creek. A revised map of Regional Ecosystems has been prepared (refer **Figure 10-1**). A map amendment request will be submitted to the Dept of Natural Resources Mines and Energy (NRM&E) to rectify the anomalies in the current Regional Ecosystem mapping.

There are no Category A Environmentally Sensitive Areas (ESAs) as defined under Schedule 1A of the *Environmental Protection Regulations 1998* (eg National Parks or State Forest) on the proposed Mining Lease or within the adjacent area.

The majority of the study area is highly modified and provides limited habitat opportunities for native fauna communities although some native fauna species will utilise the remnant habitat areas and grazing habitats that remain. In particular, the poor condition of the ground habitat suggests relatively low biodiversity levels for ground fauna. The most significant habitat features within the study area are the riparian vegetation corridors of Smoky Creek, and the Unnamed Watercourse. The Smoky Creek riparian corridor provides a continuous, vegetated linkage between the Isaac River and upstream habitat areas and is likely to be of at least local (possibly Provincial) significance, as a fauna corridor. Smoky Creek also represents the most significant wetland feature within the study area.

Lists of threatened and migratory flora and fauna scheduled under Queensland's *Nature Conservation Act 1992* (NCA) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), that are known to occur in the study region, were assessed to provide a list of species that are likely or possible inhabitants of the study area.

Scheduled flora species that are likely or possible inhabitants of the study area include:

- 1 rare species listed under the NCA.

Scheduled fauna species that are likely or possible inhabitants of the study area include (note that some species are listed under both the NCA and EPBC Act):

- 1 endangered, 3 vulnerable and 5 rare species scheduled under the NCA;
- 4 vulnerable species scheduled under the EPBC Act; and,
- 6 migratory or other species listed under the EPBC Act.

A summer survey was undertaken for the rare flora species *Desmodium macrocarpum*, within the Poplar Box patch (RE 11.5.3) that will be disturbed during the project. The species was not located during this survey at a time of year when it would be expected to be evident and it was concluded that the species does not occur in the area.

The Squatter Pigeon (*Geophaps scripta scripta*) was observed within the same Poplar Box patch and it is likely that the species utilises all of the woodland areas within the study area. Squatter Pigeons were also observed elsewhere in the study region during the summer survey.



Legend

- | | |
|------------------|----------------|
| EPC 755 boundary | Endangered |
| Drainage | Of concern |
| MLA boundary | Not of concern |
| Access road | Boxcut |
| Haul road | Pit |
| Infrastructure | Internal spoil |

Bowen Central Coal Management Pty Ltd Isaac Plains Project Regional Ecosystems

Datum: ADG 84
Projection: TM, zone 55

0 1 2
kilometres

FIGURE 10-1
Page 309 of 351

10.2 POTENTIAL IMPACTS

Potential impacts of the proposal on flora and fauna are associated with:

- Disturbance of remnant vegetation;
- Translocation of Parthenium;
- Noise;
- Lighting;
- Vehicle collisions with fauna;
- Cable crossings of Smoky Creek;
- Aquatic continuity in Smoky Creek;
- Hydrology and water quality in Smoky Creek; and,
- Impacts on rare, threatened or migratory species, populations and communities.

10.2.1 Remnant Vegetation

The proposed pit area will impinge on one remnant vegetation area comprising approximately 45 ha of RE 11.5.3 (*not of concern*). Infrastructure for the project will be located in disturbed areas apart from two road crossings of Smoky Creek which will require some disturbance of the *of concern* sub-dominant vegetation (RE 11.3.25/11.3.4) associated with the riparian corridor. A small area (0.1-0.4 ha) of RE 11.5.9 (*not of concern*) will be removed to accommodate the access road where it enters the study area on the southern boundary adjacent to the Peak Downs Highway.

Figure 10-1 illustrates the extent to which the pit and associated infrastructure will impinge upon remnant vegetation within the study area. **Table 10-1** indicates the areas of remnant vegetation to be affected by the pit and associated spoil dumps. The majority of the pit and spoil dump area is located within highly modified non-remnant grazing lands. It is not anticipated that there would be any additional disturbance of remnant vegetation outside of the pit area, as there are extensive areas of non-remnant vegetation adjacent to the pit and spoil dumps that are available for placement of infrastructure. The processing plant, stockpile/loading facility and water infrastructure will be located to the north west of the pit area in non-remnant vegetation.

Table 10-1 Indicative Areas of Disturbance to Remnant and Non-remnant Vegetation

Item	Estimated Area to be Disturbed (ha)	% of Total Pit Area
Total Pit Area and spoil dumps	286	100
<i>Of Concern</i> dominant Regional Ecosystems	0	0
<i>Of Concern</i> sub-dominant Regional Ecosystems	0*	0
<i>Not of Concern</i> Regional Ecosystems	45 [#]	16
Regrowth/Disturbed areas	241	84

* Although not affected by the pit and spoil dumps there will be minor disturbance associated with the road crossing of Smoky Creek.

There will also be a strip of RE 11.5.9 removed to accommodate the access road in the south, amounting to approximately 0.1-0.4 of a hectare.

Approximately 45ha of *not of concern* remnant vegetation will be disturbed, comprising a large proportion of the isolated patch of RE 11.5.3 (Poplar Box woodland on sediments) that occurs to the north of Smoky Creek. The current extent of this RE at the Bioregion and sub-region scale is indicated in **Table 10-2** (Accad *et al* 2003). The loss of 45ha as part of the proposed project will not significantly advance the RE towards the 30% remnant area threshold at which RE's are considered *of concern*.

Table 10-2 Current (2001) and Pre-clear Extent of RE 11.5.3 (Accad et al, 2003).

Bioregion	Pre-clear Area	2001 remnant area	
		ha	% of pre-clear
<i>Brigalow Belt</i>	951,321	413,329	43.5%
<i>Northern Bowen Basin sub-region</i>	140,278	79,795	56.9%

A strip of *not of concern* RE 11.5.9 (Narrow leaved ironbark) will require removal to accommodate the access road in the south, amounting to approximately 0.1-0.4 ha.

10.2.2 Rare and Threatened Flora and Fauna

This section relates to rare, threatened or migratory species protected under the Queensland *Nature Conservation Act 1994* (NCA) and/or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC), as discussed in **Section 10.1**.

Rare, threatened and migratory flora and fauna are most likely to be associated with the areas of remnant vegetation that persist within the study area. Given the limited extent and poor condition of remnant habitats within the study area it is not anticipated that the study area represents critical habitat for any rare, threatened or migratory species. Furthermore, given the proposed minimal disturbance of remnant vegetation (approximately 45 ha) and the mitigation measures proposed, it is not anticipated that the project will lead to significant impacts on local flora and fauna populations, or rare, threatened or migratory species, communities or populations listed under State or Commonwealth legislation. The project is not considered to result in a significant impact on a 'Matter of National Environmental Significance'.

With respect to the Squatter Pigeon (*Geophaps scripta scripta*), approximately 45ha of woodland habitat known to be utilised by the species will be removed. The balance (215ha) of suitable woodland habitat within the study area will not be affected by the proposal, including the continuous riparian woodland along Smoky Creek. More extensive areas of potential woodland habitat occur in the surrounding area, particularly the broad band of riparian woodlands along the nearby Isaac River.

10.2.3 Smoky Creek Riparian Corridor

Significantly, following the results of initial ecological assessments, the pit layout has been designed to avoid the riparian corridor of Smoky Creek and will not disturb any remnant vegetation within the corridor. Levee banks will also be located outside of the riparian vegetation. Avoidance of the riparian corridor ensures that the area of *of concern* RE 11.3.2 which occurs adjacent to Smoky Creek will not be disturbed. As a result, the habitat corridor of Smoky Creek will not be disturbed apart from the provision of a road crossing points, and the physical connection between the Isaac River and habitat areas upstream of the study area will not be significantly affected.

10.2.4 Noise

The noise produced by machinery operating within a mine-site has the potential to adversely affect native fauna. While some species of native fauna can adapt to noise, it is likely that some species currently utilising habitat within the study area will be deterred or repulsed by mine-site noise. These repulsion effects are likely to occur predominantly in close proximity to the source of the noise such that only the habitat areas in close proximity to the pit area are likely to be affected. While it is suspected that noise impacts may reduce the tendency of some species to utilise habitat areas in close proximity to the pit area, it is not anticipated that it will substantially affect the overall native fauna biodiversity supported in habitat areas within the study area. Of most concern is the effect of noise on the ability of fauna to move along the Smoky Creek riparian corridor. Given the intermittent and localised nature of noise produced by mining vehicle movements, and the relatively incised nature of Smoky Creek which provides some noise level attenuation, it is not anticipated that the utility of the Smoky Creek riparian corridor as a conduit for fauna movement will be significantly affected by noise associated with the project. Furthermore, it is not anticipated that noise levels will significantly affect the overall utilisation of the study area by rare, threatened or migratory fauna although some localised repulsion of such fauna may occur from time to time.

10.2.5 Lighting

Mine-sites are typically well illuminated at night to provide safe working conditions for night-time operations. Elevated light conditions within woodland habitat areas has the potential to adversely affect activity by some nocturnal fauna, due predominantly to the chance of greater predation levels under the illuminated conditions, or by the avoidance of illuminated areas by potential prey species. Direct illumination of the Smoky Creek riparian corridor should be avoided as far as possible, in order to maintain the best possible conditions for fauna utilisation of the area.

10.2.6 Vehicle Collisions with Fauna

Increased vehicle movements will result in a greater probability of collisions with fauna, including kangaroos, ground-feeding birds, nocturnal predatory birds, frogs and reptiles. Overall, it is not anticipated that elevated mortality rates of such fauna will be of a magnitude that will significantly affect local populations of the species; however, mortality of fauna utilising the Smoky Creek riparian corridor should be minimised wherever possible. In the vicinity of the Smoky Creek corridor, potential mortality is associated with the haul road and light vehicle access road.

10.2.7 Cable Crossings of Smoky Creek

It is not known whether there will be any aerial power cables strung across Smoky Creek; however, should they be required, there may be a low potential for collision and mortality or injury by flying fauna (birds, bats). Given the significance of the Smoky Creek corridor as a fauna corridor, the potential for mortality should be reduced through the use of visible devices.

10.2.8 Aquatic Continuity in Smoky Creek

Although an ephemeral stream that is dry for the majority of the year, Smoky Creek may provide significant habitat for fish and other aquatic fauna during and following flow events.

10.2.9 Hydrology and Water Quality in Smoky Creek

Changes to the natural hydrology or water quality in Smoky Creek have the potential to affect the values of the stream habitat for native fauna. Key factors will be the quality of waters flowing into the creek; the formation and persistence of pools following flows; and, the quality of water within pools and waterholes following flows.

10.2.10 Weeds

Notable weeds encountered within the proposed mining lease include Parthenium Weed (*Parthenium hysterophorus*), which is a declared a Pest Plant under the *Rural Lands Protection Act 1986*, and Buffel Grass. Parthenium Weed occurs mainly on disturbed soil surfaces, such as along fence lines, tracks, and stream banks.

During the construction and operational phase of the project, environmental management measures will be required to prevent the transportation of Parthenium off the property. Translocation of Parthenium within the property is not a significant issue as it already occurs throughout the sections of the property that will be used for the project.

A vehicle wash down facilities will be constructed at the Main Infrastructure Area to reduce the spread of weeds such as Parthenium and other pathogens.

Buffel Grass grows in the cleared areas, where it is grown extensively within the region as a desirable grazing species. It is not practical to attempt to control the spread of Buffel Grass from the proposed mining lease.

10.2.11 Fire Management

An appropriate fire regime may assist in maintaining a healthy native grass cover, and to assist in maintaining remnant native ecosystems and thereby control the spread of weeds within the proposed mining lease area.

10.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

ENVIRONMENTAL PROTECTION OBJECTIVES & STRATEGIES – NATURE CONSERVATION	
Environmental Value	Integrity of the surrounding natural ecosystems and conservation values for flora and fauna are protected.
Environmental Protection Objective	Confine clearing of habitat of rare and vulnerable species to that essential for the Mine. Ensure there is no adverse water quality impacts the local waterways.
Performance Indicators/Criteria	Extent of clearing. Implementation of a weed management plan for construction and operations. Extent of clearing does not exceed that set out in the Plan of Operations. Water quality characteristics in local creeks (refer to Water Management Commitments). Weed management in accordance with <i>Rural Lands Protection Act 1985</i>
Control Strategies	Restrict clearing of all vegetation areas to that essential for the Mine. Include strategies to manage the impact of such clearing in the Plan of Operations. Wherever possible and practical, stripped vegetation should be placed on rehabilitated areas to provide a habitat for small fauna, and accelerate ecosystem redevelopment. Map and quantify annual clearing requirements in the Plan of Operations. Induction programs for site personnel on nature conservation and weed control issues. Smoky Creek Riparian Vegetation <ul style="list-style-type: none"> Clear minimum amount necessary to establish access; Located crossing alignment in such as way to minimise the area of riparian woodlands. Locate crossings at natural breaks in the corridor, where possible. Cross riparian crossing perpendicularly; Where possible, riparian vegetation should be left either side of the crossing, with lateral branches lopped to maintain clear passage rather than complete removal.

ENVIRONMENTAL PROTECTION OBJECTIVES & STRATEGIES – NATURE CONSERVATION	
	<p>Noise</p> <ul style="list-style-type: none"> Proposed flood Levees up to 2 m in height should create some noise attention to faunal movement along the riparian corridors. <p>Lighting</p> <ul style="list-style-type: none"> It is recommended that lighting should be installed in such a way to avoid direct illumination of Smoky Creek. The flood levees up to 2 m in height should provide control of illumination. <p>Vehicle Collisions with Fauna</p> <ul style="list-style-type: none"> Crossing should be design to facilitate the safe passage of fauna by directing fauna into safe passage area and prevent the road crossing. Speed restrictions of light vehicle crossings would enhance the ability to detect and avoid crossing fauna. <p>Cable Crossings of Smoky Creek</p> <ul style="list-style-type: none"> Aerial cable crossings (eg high voltage electricity) across Smoky Creek should be fitted with bird flight diverters (eg Bird-Flight™) at spacings that satisfy the manufacturer's application recommendations. <p>Aquatic Continuity</p> <ul style="list-style-type: none"> Any road or infrastructure crossings of Smoky Creek and the Unnamed Watercourse should be constructed so as not to represent a passage barrier for fish or other aquatic fauna. <p>Weeds</p> <ul style="list-style-type: none"> Develop a Weed Management Plan for the construction and operational phases, including weed surveys and controls on the transfer of weeds by construction and mining equipment. All vehicles during the construction phase should be thoroughly washed prior to leaving the property to avoid the off-site spread of Parthenium. <p>Fire</p> <ul style="list-style-type: none"> A Fire Management Plan for the life of the mine should be developed as part of the Plan of Operations, in consultation with the EPA, BSC and the regional fire brigade. BCC's Fire Management Plan should include the use of an appropriate fire regime to assist in maintaining a healthy native grass cover, and to assist in maintaining remnant native ecosystems and thereby control the spread of weeds within the proposed mining lease area.
Commitment 25	A Weed Management Plan will be developed and implemented during the continuation of this authority, and prior to the commencement of construction activities. The Weed Management Plan will describe how the weeds are to be managed in accordance with the <i>Rural Lands Protection Act 1985</i> .
Commitment 26	On an annual basis, areas of vegetation within the Mine to be cleared, (including significant Vegetation Communities), will be identified and detailed with maps, in the Plan of Operations.
Commitment 27	Prepare a Fire Management Plan for the mine.

11 CULTURAL HERITAGE

11.1 ENVIRONMENTAL VALUES

Native title on the freehold and leasehold lands in which the mine will be established has been extinguished. However, the site may still have the potential for items of cultural heritage significance. To identify potential items, a cultural heritage survey is currently in progress (completion expected in March 2005) with the registered native title claimant groups for the area. A search of the National Native Title Tribunal register by McCullough Robertson Lawyers on 20 December 2004 indicates there are two registered native title claimant groups on EPC755 including:

1. Barada Barna Kabalbara & Yetimarla People # 3 (Federal Court No. Q6011/01; NNTT No. QC01/13); and
2. Barada Barna Kabalbara & Yetimarla People # 4 (Federal Court No. Q6023/01; NNTT No. QC01/25).

The cultural heritage survey will form the basis of a Cultural Heritage Management Plan/Agreement which is required to demonstrate a cultural heritage duty of care pursuant to Section 23 of the *Aboriginal Cultural Heritage Act 2003*.

11.2 POTENTIAL IMPACTS

Potential impacts due to the construction and ongoing mine operations include disturbance to items of cultural heritage significance (eg stone artefacts etc). A cultural heritage management plan (CHMP) will be developed in consultation with the traditional owners and will be implemented to ensure that no items of cultural heritage significance are disturbed during the construction and operational phases of the mine.

The implementation of a cultural heritage management plan will ensure that items of cultural heritage significance, should they be found to exist, will not be disturbed or removed without approval.

11.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

Environmental Value	Cultural heritage objects or values in the Mine area with cultural heritage significance.
Environmental Protection Objective	Minimise impact on cultural heritage values to that essential for the Mine. Maintain appropriate communication protocols with Traditional Owners.
Performance Indicators/Criteria	Implementation of the Cultural Heritage Management Plan prepared in co-operation with Traditional Owner representatives. Protocols set out in Cultural Heritage Management Plan for: site surveys, site evaluation, salvage and safekeeping, restriction of access, communication with Traditional Owners. Permit requirements under the <i>Aboriginal and Cultural Heritage Act 2003</i> .
Control Strategies	Follow protocols set out in Cultural Heritage Management Plan for: site surveys, site evaluation, salvage and safekeeping, restriction of access, response to previously unrecorded material, communication with Traditional Owners. Supplement existing archaeological surveys where necessary. Identify restricted areas on site plans. Prevent unauthorised disturbance of sites by warning signage or fencing. Inductions to include cultural heritage protection.
Commitment 28	Cultural heritage matters will be managed in accordance with the site Cultural Heritage Management Plan.
Commitment 29	The site Cultural Heritage Management Plan will identify cultural heritage areas that have access restrictions.
Commitment 30	Workplace procedures that respond to the discovery of previously unrecorded cultural, heritage or indigenous sites located during mining operations will be developed and implemented during the continuation of this authority and prior to the commencement of construction and future exploration activities.

12 COMMUNITY

12.1 ENVIRONMENTAL VALUES

Given the relatively small size of the project compared to others in the region, and the fact that the township of Moranbah was established to service the surrounding mining community, impacts on the social profile of the community are expected to be negligible. Localised impacts such as noise, dust, vibration etc on the three residential dwellings located in relatively close proximity to the site, have been addressed elsewhere in this EMOS.

Notwithstanding this, stakeholder engagement will occur as needed to inform the community about the project and to assist with community understanding of the opportunities and constraints presented by the operation of a mine.

Engagement of stakeholders will be focused on identifying potential adverse social impacts, and then formulating mitigation solutions that are developed by all key stakeholders. In this way, solutions that are put into practice have ownership by the community and stakeholders in the area, and the opportunities for successful management are maximised.

12.2 POTENTIAL IMPACTS

Potential impacts on social profiles include:

- The potential for unbalanced demographic profile as a result of a traditionally male-oriented workforce
- A population influx that is likely to generate additional recreational, sporting and social activities;
- Impacts on existing lifestyles, enterprises and familiarity with community members;
- Incoming Mine workforce;
- Increased pressure on local services and human infrastructure (e.g., schools, housing, health, ambulance and fire services)

Beneficial impacts on local and regional communities are expected to include:

- Direct and indirect employment;
- Use of local and regional contractor services;
- Purchase of local and regional goods and materials;
- Increased discretionary expenditure by mine employees; and
- Increased demand for housing contractor services.

BCC has developed an effective means of engagement with directly affected landholders and broader landholders as demonstrated by the bore census. Stakeholder engagement will continue as required.

Engagement of stakeholders will be focused on identifying potential adverse social impacts, and then formulating mitigation solutions that are developed by all key stakeholders. In this way, solutions that are put into practice have ownership by the community and stakeholders in the area, and the opportunities for successful management are maximised.

12.3 ENVIRONMENTAL PROTECTION OBJECTIVES & CONTROL STRATEGIES

Environmental Value	Community interaction, open and friendly neighbourhoods with community kinship values, quietness and the high level of safety.
Environmental Protection Objective	Maintain or improve access to employment. Minimise safety hazards at the Mine access road junction. Minimise post-mining safety hazard.
Performance Indicators/Criteria	Number of complaints lodged by the public. Number of Belyando Shire residents applying for jobs. Number of accidents at mine access road intersection. All complaints received responded to within one month. Department of Main Roads design standards for intersections.
Control Strategies	Identify local social and community infrastructure issues by regular consultation with Belyando Shire Council and shire residents. Design the mine access road intersection in accordance with Department of Main Roads requirements. Complaints investigation and recording system. Prevent unauthorised access by the public to final voids.
Commitment 31	A complaints register will be established. Any relevant nuisance complaint to be reported to the administering authority, investigated, and any if necessary remedial actions taken.

12.4 PROPOSED EA CONDITIONS

- (G1-1) All complaints received must be recorded including details of complainant, reasons for the complaint, investigations undertaken, conclusions formed and actions taken. This information must be made available for inspection by the administering authority on request.

RTI DL RELEASE / EHP

13 IMPLEMENTATION AND OPERATIONS

13.1 CONTINUOUS IMPROVEMENT

Rehabilitation research, monitoring and trials aimed at improving rehabilitation techniques will be ongoing at the Isaac Plains Mine. Site environmental management practices will be refined in the light of company, industry and operational experience in order to improve performance.

13.2 MONITORING

Details of measurable indicators for environmental monitoring are provided in the respective strategies for Air Quality, Water Management, Land Management, Noise, Waste Management, Nature Conservation, Cultural Heritage and Community.

A monitoring program will be developed as part of the Plan of Operations to measure variables relevant to licence conditions, and to measure the environmental performance of any operational system or activity which may have an impact upon compliance with the EA conditions. The monitoring program will follow recognised codes, standards and guidelines, where appropriate, for selection of sample locations, sampling protocols, selection of parameters, sample analysis, and quality assurance. It will also contain records of any appropriate ancillary information which will assist in interpretation of results.

Laboratory analysis will be undertaken by a NATA registered laboratory accredited for the analysis.

All monitoring and research data collected in accordance with the EA will be maintained and catalogued to allow ready access by company staff and the EPA.

13.3 TRAINING

All employees and contractors involved in the construction, operation and rehabilitation of the Isaac Plains project, will be appropriately qualified and experienced to undertake their relevant tasks. All employees will receive a site specific induction which shall include environmental responsibilities prior to commencement of work on the Isaac Plains mine. The induction training will focus on training staff on this EMOS and the environmental duty of care under the *Environmental Protection Act 1994* and the cultural heritage duty of care under the *Aboriginal and Cultural Heritage Act 2003*.

Additional training will be given to those engaged in activities where specific environmental capabilities may be required to ensure compliance with the Environmental Authority.

13.4 ENVIRONMENTAL AUDITING

Periodic internal and external environmental audits will be conducted of the Isaac Plains Mine in accordance with corporate environmental requirements. The audit reports will be used internally to improve environmental performance and monitor regulatory compliance.

14 ENVIRONMENTAL REPORTING

Reporting will be provided to the EPA in accordance with the requirements of the Environmental Authority. As a minimum, an annual environmental report will be prepared and forwarded to the EPA as part of the Annual Return and also for the National Pollutant Inventory. To support the annual report, a schedule of statutory and corporate reporting requirements will be maintained and responsibilities assigned. All monitoring, research and planning data collected in accordance with the EA will be maintained and catalogued to allow ready preparation of statutory and corporate reports.

A complaints/incidents register will also be maintained for complaints about activities associated with the mine. The following records are required to be kept in the Project Register in the event of an incident or complaint:

- time, date and nature of the incident/complaint;
- type of communication (for complaints only, eg telephone, letter, in person, etc.);
- name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then 'Not Identified' is to be recorded);
- response and investigation undertaken as a result of the incident/complaint;
- name of person responsible for investigating the incident/complaint; and
- corrective action taken as a result of the incident/complaint investigation and signature of responsible person.

The complaints/incidents register will be developed through the Plan of Operations.

RTI DL RELEASE - EHP

15 REFERENCES

Environmental Protection Agency (2003), *Guideline 8 Preparing an environmental management overview strategy (EMOS) for non-standard mining projects*. (March 2003)

Institute of Engineers Australia (1996) *Soils Erosion and Sediment Control –Guideline for Queensland Construction Site*, Queensland Division

Matrix+ Consulting Pty Limited (2005), *Isaac Plains Project - Environmental Assessment Report*. (March 2005).

RTI DL RELEASE - EHP

**DRAFT TRANSITIONAL ENVIRONMENTAL
PROGRAM FOR ISAAC PLAINS COAL MINE UNDER
SECTION 333
OF THE *ENVIRONMENTAL PROTECTION ACT 1994***

Principal Holder: VALE AUSTRALIA (IP) PTY LTD
IP COAL PTY LTD

EA Number: MIN100329505

Title: Isaac Plains Coal Mine

Date: 15 December 2010

Finish Date: 30th June 2011

1. BACKGROUND AND SUMMARY

Isaac Plains Coal Mine was inundated by a large storm which started on Saturday 11th December. The site weather station received a total of 158.4mm of rain during the event, over 100mm of this was received during a period of 1.5 hours. Survey undertaken on the high water marks of Smoky Creek has indicated a 1 in 100 flooding event has been exceeded.

During this rain event, a recently completed levy bank on the south western corner of the N1 pit was breached by Smoky Creek, filling the active pit with creek water. Over land flows were also experienced bringing surface flows over the high walls of all pits and filling both release dams to 100% capacity.

Critical water volumes residing in the pits and dam are as follows:

- N1 pit – 4372 ML
- S2 pit – 170 ML
- Release Dam 1 (RD1) - 205 ML

As a result of this rainfall event, Isaac Plains is proposing to discharge a total of **4747 ML** of water into the Isaac River system.

As advised by the Department of Environment and Natural Resources, a Transitional Environmental Program (TEP) (under Section 330 of The *Environmental Protection Act* 1994) is required to discharge the above volumes into the Isaac River system during low flow events. This will allow operations to restart in N1 and S2 pits and maximise storage capacity for the continuation of the wet season.

Under the current water discharge conditions of the EA, discharges may be undertaken from release points RD1 and RD2 and only during flow events within Smoky Creek.

Isaac Plains is seeking approval of this TEP by DERM to:

- Discharge flood waters directly from N1 pit direct to Smoky Creek during low flow events in the Isaac River,
- Discharge flood waters directly from S1 pit to Smoky Creek during low flow events in the Isaac River,
- Discharge flood waters from RD1 to Smoky Creek during low flow events in the Isaac River.

Recent water quality data in Table 1 shows sampling from N1 and S2 pits is comparable to water quality data obtained from the Isaac River during flow events. As water quality of the above mentioned pits/storage dams is of similar or better quality than the Isaac River background data, it is understood that mixing of the two waters may not be essential. It is on this basis that Isaac Plains proposes a minimum flow rate of 0.3 m³/sec is required in the receiving waters of the Isaac River prior to a release event.

Water quality of discharge water will be monitored as per the frequency and analytes detailed within the current EA, as will flow rates in the Isaac River. If water quality characteristics change significantly, discharging will cease and further actions or alternate strategies will be discussed with the DERM. Water quality monitoring locations will be as per figure 1.

Pumping rates will be determined by the maximum flow capability of Smoky Creek, flow rates will not exceed the natural high water mark on the internal banks. This will ensure the integrity of the riparian

zone and remove the risk of scouring and erosion. Should unforeseen scouring and erosion issues result from the proposed flows in Smoky Creek, Isaac Plains will remediate and maintain these areas.

The local downstream user and landholder Mr Ross Flohr, has been consulted and has stated he has no issues with the long term release of water from site.

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2. SUPPORTING INFORMATION

Supporting information is provided below in regards to the specific requirements listed in the *Environmental Protection Regulation 2008* for matters to be considered for environmental management decisions.

Section S51(1) (a)

IPCM have considered the management of hierarchy to determine the best fit management response for the additional water on site. Due to the total volume of water on site, Isaac Plains cannot transfer this water into an alternate storage point. Where opportunities allow, additional water will be reused for dust suppression via water carts on site however this is limited to approximately 40ML per month during dry conditions. There is currently no alternate option other than to release this water.

Water quality values of release waters have been determined to be comparable to / or of better quality than the background water quality of receiving waters. As a result, Isaac Plains has considered possible impacts to: environmental values, biological integrity, agricultural value, drinking water value, recreation value and the value for industrial use and believe there will be no adverse impacts on the values of these applications.

Section s51(1) (d)

IPCM believe there will be relatively low possible cumulative impacts to the receiving environment as the water quality of the proposed release water is comparable to background water quality data from the Isaac River.

IPCM have also considered flow rates of release water and potential impact to the receiving environment of Smoky Creek. IPCM have determined that under typical flooding situations, flow rates of Smoky Creek are above 19.6 m³/sec. IPCM are proposing a maximum flow rate of 7.5 m³/sec at any time in Smoky Creek, with a typical pumping rate of 3.0 m³/sec during release. IPCM have determined these pumping rates will ensure the integrity and environmental values of the Smoky Creek riparian zone, whilst minimising the potential for scouring and erosion issues.

Section s51(1) (f)

IPCM have undertaken consultation with directly affected downstream users of Smoky Creek and there are currently no issues associated with the water release.

Section s51(1) (g)

As mentioned above, IPCM have considered pumping rates and compared these with natural flow rates in Smoky Creek. Pumping rates will not adversely affect the capacity for Smoky Creek or the Isaac River to accept these levels. As water quality is similar to background levels in the receiving environment the capacity to accept contaminants will also be acceptable.

Section s52(1) (a)

IPCM will develop a specialised procedure which will document: monitoring locations, monitoring frequency and detail trigger points which will allow for the cessation of the release if contaminants vary.

Section S52(1) (g)

IPCM have also considered flow rates of release water and potential impact to the receiving environment of Smoky Creek. IPCM have determined that under typical flooding situations, flow rates of Smoky Creek are above 19.6 m³/sec. IPCM are proposing a maximum flow rate of 7.5 m³/sec at any time in Smoky Creek, with a typical pumping rate of 3.0 m³/sec during release. IPCM have determined

these pumping rates will ensure the integrity and environmental values of the Smoky Creek riparian zone, whilst minimising the potential for scouring and erosion issues.

Release of waters will continue up until flow rates within the Isaac River drop to 0.3 m³/sec. Release of water will also cease if water quality parameters of released waters are trigger the minimum / maximum levels for release. Released water will be pumped from the surface or upper water column, therefore temperatures will be typical of natural flows and the risk of cold water pollution will be removed. This extraction method will also reduce any potential impacts associated with the release of water containing higher concentrations of EC, dissolved metals and metalloids. IPCM understands that water quality at depth may be unsuitable to discharge. Extraction from the upper water column and rigorous water quality monitoring from the point source will eliminate the potential for discharge of non compliant water.

Section s53 (1)

Monitoring will comply with the conditions of this TEP.

Section s56 (2)

IPCM believes in the early stages of water extraction, release water is comparable to the natural flows within the receiving environment. This is predicted to change as extraction continues toxicity of the pit water may increase. IPCM have implemented in pit water quality profiling (see section 5 of this document) to mitigate this potential risk to the receiving environment.

In accordance with Section 330 of The Environmental Protection Act 1994, the purpose of the TEP is to identify and apply control measures in relation to the proposed works in order to:

- a. reduce environmental harm; and
- b. detail the transition of these towards the acquired environmental standard.

The purpose of the TEP is to also satisfy the requirements of:

- a. state the objectives to be achieved and maintained under the program for an activity; and
- b. state how the objectives are to be achieved, and a timetable to achieve the objectives, taking into account—
 - i. the best practice environmental management for the activity; and
 - ii. the risks of environmental harm being caused by the activity; and
- c. state appropriate performance indicators at intervals of not more than 6 months; and
- d. make provision for monitoring and reporting compliance with the program.

3. TEP OBJECTIVES

The objective of this TEP is to outline dewatering activities that will allow the Isaac Plains Coal Mine to return to normal operating conditions as a result of recent flooding of the site due to heavy localised rainfall, and the diversion of Smoky Creek into the N1 and S1 Pits as a result of a Levee Bank failure.

This TEP will apply to dewatering activities occurring outside of water management requirements outlined in the Isaac Plains Coal Mine Environmental Authority.

There are five (5) specific objectives:

- To ensure water quality requirements for discharged water are achieved in order to minimise environmental harm;
- To ensure water quantity discharges occur only when there is sufficient natural / background flow in the Isaac Plains River;
- To manage dewatering activities under this TEP for the duration that the TEP is required;
- To ensure that consultation occurs with affected downstream landholders and relevant stakeholders and that community and landholder impacts are mitigated; and
- To conduct an investigation into the circumstances that have required this TEP and to identify causal and contributing factors and implement the findings of the investigation in a timely fashion.

Performance Indicators

The performance indicators towards each of these objectives are identified in Table 1. These indicators have been chosen in order to comply with statutory and approval conditional requirements under this TEP.

There will be no significant decrease in water quality or long term impacts on sensitive receptors as a result of the implementation of this TEP. Water quality management will be addressed by implementing the water quality monitoring program and contingency procedures as detailed in Sections 5 to 9.

Management Measures

To minimise the potential water quality impacts of dewatering activities from the Isaac Plains Coal Mine, the management measures triggered by the water quality monitoring program (Sections 5 and 6) will be implemented through contingency procedures as outlined in Section 9.

4. HOW TEP OBJECTIVES ARE TO BE ACHIEVED

Table 1 – TEP Objectives

OBJECTIVE	ACTION	RESPONSIBILITY	TIME FRAME	PERFORMANCE INDICATOR
Achieve water quality requirements for discharged water in order to minimise environmental harm	<ul style="list-style-type: none"> Water Quality Monitoring carried out for all discharges in accordance with the requirements specified in the TEP (parameters, frequency etc...) Background water quality monitoring of receiving waters in accordance with the requirements specified in the TEP (parameters, frequency etc...) Monitor physical condition of immediate receiving waters (Smoky Creek and Isaac Plains River) regularly during discharge events 	Senior Site Executive – Cameron Farrington	Daily until completion of dewatering activities	<ul style="list-style-type: none"> Discharge Water Quality is in accordance with the TEP requirements Water quality results reported to DERM in accordance with the requirements specified in section 7 of this TEP (parameters, frequency etc...) No significant degradation of receiving water physical condition – stream bank condition / erosion etc. Any rehabilitation of water courses will be undertaken through appropriate legislation.
Achieve water quantity requirements for discharged water in order to minimise flow disturbance	<ul style="list-style-type: none"> Discharges only to occur when sufficient natural flow in receiving waters (Isaac Plains River) as measured at the Goonyella Monitoring Station. Conduct ongoing measurement of natural flow and discharge quantities / flow rates 	Senior Site Executive – Cameron Farrington	Daily until completion of dewatering activities	<ul style="list-style-type: none"> No discharge during no flow conditions in the Isaac River Discharge of up to approximately 80 ML/Day Flow gauging data collected and maintained Discharges quantities/times reported to DERM
Conduct internal investigation and implement findings in order to prevent reoccurrence	<ul style="list-style-type: none"> Rectification earthworks on levy banks completed Internal investigation to detail causal and contributing factors 	Senior Site Executive – Cameron Farrington	Completion of investigation by 15 January 2011	<ul style="list-style-type: none"> Rectification earthworks completed by 22nd December 2010 Completion of investigation findings and actions within specified timeframes
Mitigate affects on downstream landholders	<ul style="list-style-type: none"> Conduct consultation with immediately affected downstream landholders and mines where applicable Provide information to other affected stakeholders 	Senior Site Executive – Cameron Farrington	Completion of dewatering activities by 28 February 2011	<ul style="list-style-type: none"> No complaints from landholders / community / stakeholders No impacts to immediately affected downstream landholders
Complete dewatering activities by 26 May 2011	<ul style="list-style-type: none"> Completion of dewatering activities by 26 May 2011 	Senior Site Executive – Cameron Farrington	Completion of dewatering activities by 26 May 2011	<ul style="list-style-type: none"> Dewatering completed by 26 May 2011 in accordance with the TEP requirements.

5. MONITORING – WATER QUALITY

This section of the TEP provides detail of the proposed release and monitoring points associated with dewatering, and the specific water quality monitoring that will be conducted to ensure the TEP objectives are met.

This water quality monitoring program determines the range of key water quality parameters to be assessed throughout the dewatering activities of the Isaac Plains Coal Mine. The water quality monitoring program will provide a rational basis for adopting Water Quality Objectives (WQOs) for the Isaac River that will apply during the activities.

WQOs for water discharge are intended to protect the quality of receiving waters and to assist in determining the potential impacts associated with the process.

Monitoring of water physical parameters (i.e., turbidity, pH) will be conducted by a competent person, in accordance with the DERM water quality sampling manual, and must be representative samples.

Visual observations will be undertaken continually during the monitoring of water quality to include no presence of oil, floating scum, or litter arising from the dewatering operation. Refer to Section 7 regarding the recording and reporting of the water monitoring program.

Figures 1, 2 and 3, provide details of the proposed release; water quality monitoring and water flow monitoring points.

Regular monitoring for sediment and erosion of Smoky Creek and Isaac River will be undertaken during the release process. Monitoring will identify:

- material build up of sediment
- identification of erosion, slumping and scour impacts to the riparian zone.

If areas of the receiving environment require rehabilitation due to the above mentioned impacts, this will be undertaken by IPCM under any necessary approvals.

In Pit Water Quality Profiling

Where it is safe to do so, water quality profiling for Electrical Conductivity (EC) will be undertaken in the N1 and S1 pits during release. In situ EC pit profiling will be undertaken on a fortnightly basis to determine the characteristics of water quality at depth. EC and pH will be monitored at 5m intervals through the water column (total approximate depth 50m N1 pit). If EC results rise above trigger levels monitoring will be stepped up to weekly and will include dissolved metals and metalloid monitoring. Table 7 details monitoring locations for this monitoring.

Figure 1 Contaminant Release Points and Water Quality Monitoring Points



Water Quality Objectives

A summary of the proposed water quality objectives are provided in Tables 2 through 6.

Table 2 - Contaminant release points, sources and receiving waters

Release point (TEP RP)	Easting (GDA94)	Northing (GDA94)	Contaminant source and location	Monitoring point	Receiving waters
TEP RP 1	614860	7569533	RD1	Release Dam 1	Smoky Creek
TEP RP 2	616441	7570157	N1 and S1 Pits	TEP MP 1	Smoky Creek

Table 3 - Contaminant release water quality monitoring points

Monitoring point (TEP MP)	Easting (GDA94)	Northing (GDA94)	Contaminant source and location	Monitoring point location	Receiving waters
TEP RP 1	614860	7569533	RD1	Release Dam 1 end of pipe	Smoky Creek
TEP RP 2	616441	7570157	N1 and S1 Pits	N1 and S1 end of pipe	Smoky Creek
TEP MP 3	614811	7569122	Confluence Monitoring Point	Road crossing over Smoky Creek on Mine Lease 1.6 km d/s of TEP RP 1	Smoky Creek
TEP MP 4	607983	7570109	Upstream reference monitoring point	Isaac River Upstream of confluence Smoky Creek at Rail Bridge	Isaac River

TEP MP 5	616605	7561269	Downstream reference monitoring point	Isaac River Down Stream of confluence Smoky Creek at Peak Downs Highway Bridge	Isaac River
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Table 4 - Contaminant release water quality limits

Quality characteristic	Release Limit	Monitoring Frequency	Sample Type	Monitoring Point
Electrical conductivity (uS/cm)	500	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP MP 5
	800	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP RP 1 TEP RP 2 TEP MP 3
	No limit required – background monitoring only.	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP MP 4
pH (pH Unit)	6.5 (minimum) 9.0 (maximum)	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP RP 1 TEP RP 2 TEP MP 3 TEP MP 5
	No limit required – background monitoring only.	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP MP 4
Turbidity (NTU)	*NA	Daily during release (the first sample must be taken within 2 hours of commencement of release)	<i>In situ</i> ¹	TEP RP 1 TEP RP 2 TEP MP 3 TEP MP 4 TEP MP 5

¹ In situ samples can be taken using electronic sampling equipment.

*NA – Not available, local trigger values have not been developed for turbidity. Due to the general high turbidity levels in receiving waters of the Isaac River, turbidity will not be used as a trigger value but will continue to be monitored.

Table 5 – Contaminant Release trigger investigation levels

Quality characteristic	Trigger levels (µg/L)	Monitoring frequency	Monitoring Point
Aluminium	55	Commencement of release and thereafter weekly during release	TEP RP 1 TEP RP 2 TEP MP 3 TEP MP 4 TEP MP 5
Arsenic	13		
Cadmium	0.2		
Chromium	1.0		
Copper	2.0		
Iron	300		
Lead	10		

Mercury	0.2		
Nickel	11		
Zinc	8.0		
Boron	370		
Cobalt	90		
Manganese	1900		
Molybdenum	34		
Selenium	10		
Silver	1.0		
Uranium	1.0		
Vanadium	10		
Ammonia	900		
Nitrate	1100		
Petroleum hydrocarbons (C6-C9)	20		
Petroleum hydrocarbons (C10-C36)	100		
Sulphate	1000 mg/L		
Suspended Solids	80 th percentile of background		
Fluoride (total)	2000		

Table 6 - Downstream receiving water monitoring points

Monitoring points (TEP MP)	Receiving waters location description	Easting (GDA94)	Northing (GDA94)
TEP MP 4	Isaac River Upstream of confluence Smoky Creek at Rail Bridge	607983	7570109
TEP MP 5	Isaac River Down Stream of confluence Smoky Creek at Peak Downs Highway Bridge	616605	7561269

Table 7 – In Pit Water Quality Profile Sampling Points

Monitoring point	Easting (GDA94)	Northing (GDA94)	Contaminant source and location	Monitoring point location	Receiving waters
IPCM MP 1	616440	7570357	N1 Pit	N1 Pit Southern ramp, pumping station.	Smoky Creek
IPCM MP 2	616440	7570360	N1 Pit	N1 Pit Central ramp, pumping station.	Smoky Creek
IPCM MP 3	616440	7569957	S1 Pit	S1 Pit in ramp, pumping station.	Smoky Creek

Guidelines to be used for processing of water quality analytical data

This information covers two data types:

- insitu monitoring of common physicochemical parameters (temperature, conductivity, pH, dissolved oxygen, turbidity) using appropriately calibrated field instruments.

- laboratory analytical results from submitted water samples

Key information of interest is the variation of the range of values of a given parameter and linkage of this information to other conditions. For parameters such as turbidity and pH, these may link to preceding rainfall (24hr, 48hr and 72hr rainfall) and qualitative observations of stream flow rates..

Graphing of parameters against the same X axis time scale can often illustrate this linkage more effectively than statistical analysis.

Application of the results of water quality monitoring data

The intent of these records is to quantify the natural variability of stream flow above and below possible sites of disturbance associated with construction. Baseline monitoring at TEP MP 5 is of particular importance as it effectively demonstrates the range of natural variability that in some cases will exceed the listed discharge criteria. The effectiveness of the water monitoring results will indicate the required improvements towards implementation of effective erosion and sediment control at the point of discharge, and substantial effects and changes to the background flow volume of the receiving waters and their water quality objectives.

Ambient water quality Fitzroy Basin

The major water quality parameters of concern associated with the Isaac Plains Coal Mine are salinity (based on electrical conductivity usually measured in $\mu\text{S}/\text{cm}$), heavy metal and metalloid ion concentrations (mg/L) and acidity/alkalinity (pH).

The Queensland Water Quality Guidelines provide information on ambient salinity ranges in Fitzroy North and Central Fitzroy. The guideline states:

uses monitoring data from reference sites (permanent flowing streams) to present salinity zone percentiles for the sites in the region. Within this, the 75th percentile for electrical conductivity can be used to assess the relative long term condition of a waterway. The higher percentile (such as 90th percentile) could also be used to identify anomalously elevated sites where smaller datasets are available. It should be noted that more local monitoring and investigation may still be required in many cases, particularly where streams are ephemeral as is the case for much of the Fitzroy Catchment. In most of the catchment (Central Fitzroy), 90% of measures for EC were less than $520\mu\text{S}/\text{cm}$, the 75th percentile was $340\mu\text{S}/\text{cm}$ and the median value was less than $250\mu\text{S}/\text{cm}$. Values were higher in the Fitzroy north area (median $355\mu\text{S}/\text{cm}$). However, 90% of measures were less than $1300\mu\text{S}/\text{cm}$ and the 75th percentile was $720\mu\text{S}/\text{cm}$.

As EC is related to the number of dissolved ionic solids in water, the most common ions are those found in salt (sodium chloride), so that EC is typically a reliable surrogate for salinity. From three previous studies Queensland Water Quality Guidelines found the the majority of sites had EC levels less than $800\mu\text{S}/\text{cm}$.

6. MONITORING – FLOW RATES AND DISCHARGES

Stream Flow Monitoring

Background stream flow monitoring data has been sourced through the DERM Water Monitoring website (<http://www.derm.qld.gov.au/watershed/precomp/130414a/130414a.htm>) for the closest upstream monitoring point which is the Isaac Plains River at Goonyella Monitoring Location. This is located approximately 25 kilometres upstream from the confluence of Isaac Plains River and Smoky Creek and is the nearest long-term and reliable flow gauging station.

Isaac Plains at Goonyella

Monitoring Station 130414A

Goonyella GS 130414A Lat 21:51 S Long 147:58 E GZ 230.060m Datum AHD AMTD 242.8km
C_Area 1214sq.km

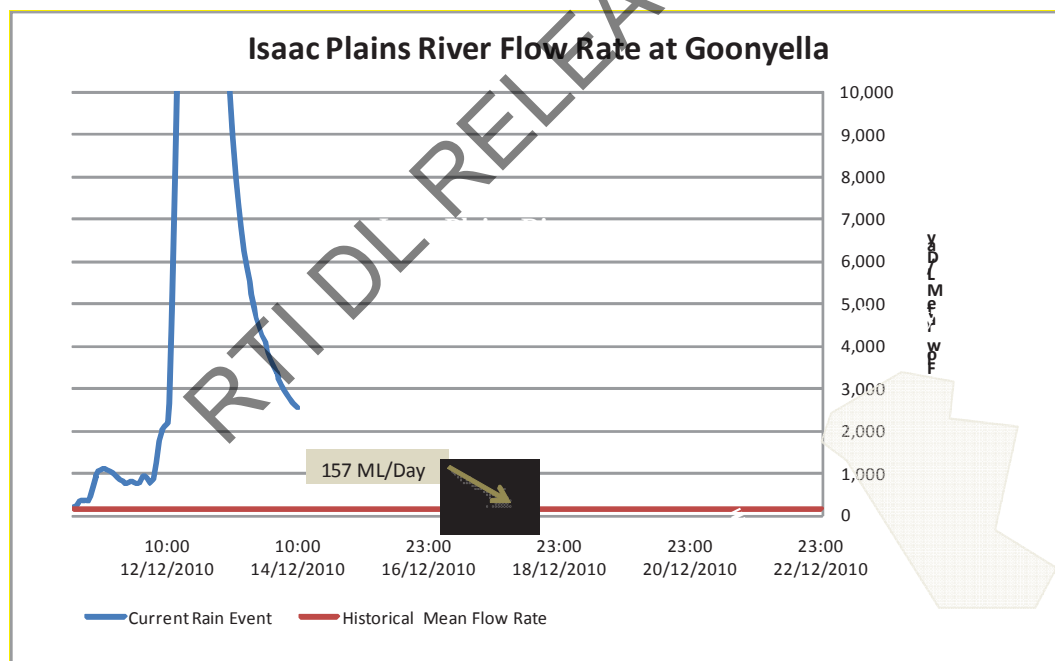
Historical Data Records 1982/83 through to 2006/07

<http://www.derm.qld.gov.au/watershed/precomp/130414a/130414a.htm>

The Goonyella Monitoring point is shown on Figure 1.

Flow rates (ML/Day) from the Goonyella monitoring location have been plotted below in Figure 3 for both historical flow data and flow data from the current rainfall event. The purpose of this figure is to assist in determining a minimum background flow to allow for dewatering activities under this TEP.

Figure 3 Current and Historical Flow Data at Goonyella



The long term mean flow rate for Isaac Plains River at Goonyella is 157 ML/Day which is approximately 1.817 cumecs. Based on recent and historical rainfall flow rates it is proposed that dewatering activities will only occur when there is a background flow rate of 0.3 m³/sec the Goonyella gauging station.

The proposed flow requirements in the receiving water (Isaac Plains River) in order to proceed with dewatering activities are provided in Table 8.

Table 8 - Flow requirements for contaminant release

Receiving waters	Release point (TEP RP)	Gauging station description	Easting (GDA94)	Northing (GDA94)	Minimum flow in receiving water required for a release event	Flow recording frequency
Isaac Plains River	(TEP RP 1)	Isaac Plains River @ Goonyella	Long 147:58:21	Lat 21:51:20	= > 0.3 m3/sec	Continuous (minimum daily)

7. REPORTING

Table 9 provides an overview of proposed reporting under the TEP.

Report	Frequency	Content	Timing	Format
Daily Water Quality and Flow Report	Daily	Daily monitoring results from monitoring locations Notification of flow releases including flow rates and durations – commencement and cessation of releases included.	By midday the following day.	Email or Fax
Weekly Water Quality Report	Weekly	Weekly summary of results from laboratory analyses	Within 24 hours of receipt of data from laboratory	Email or fax
Water Quality and Flow Exceedance Report	As required under this TEP guidelines	Details of any exceedances and actions taken as per the requirements of this TEP	Within 24 hours of confirmation of exceedance	Verbal Notification and Email or fax
Monthly Progress Report	Monthly	Progress and compliance against the TEP in relation to dewatering activities.	Submitted 5 th working day of the month for the previous calendar month	Email or fax
Final Completion Report	Completion of TEP	Detailed report providing compliance statistics and commentary against all conditions of the TEP and resultant environmental outcomes.	Submitted by the 27 th May 2011	Email or fax

8. CONSULTATION WITH STAKEHOLDERS

IPCM have undertaken consultation with the immediate downstream landholder the protection of an individual's right to

sch4p3(3) Prejudice the protection of an individual's property takes into account the mining lease, both sides of Smokey Creek and both sides of the Isaac River upstream to the rail bridge and downstream to the Peakdowns

sch4p3(3) Prejudice the protection of an individual's property takes into account the mining lease, both sides of Smokey Creek and both sides of the Isaac River upstream to the rail bridge and downstream to the Peakdowns

ch4p3(3) Prejudice the protection of an individual's property takes into account the mining lease, both sides of Smokey Creek and both sides of the Isaac River upstream to the rail bridge and downstream to the Peakdowns

h4p3(3) Prejudice the protection of an individual's property takes into account the mining lease, both sides of Smokey Creek and both sides of the Isaac River upstream to the rail bridge and downstream to the Peakdowns

As the only landholder in the directly affected area, consultation regarding land and possible impact on his agricultural business has been paramount in this process. has stated he has no issues with the release of water in Smoky creek or the Isaac River.

IPCM will also commit to undertaking consultation with any additional stakeholders during the implementation of this TEP.

9. EMERGENCY RESPONSE

Contingency Procedures

For the purposes of the water quality management program a number of management levels for water quality parameters will be set which, if exceeded, will trigger specific procedures or management techniques to be implemented. These levels are defined as follows:

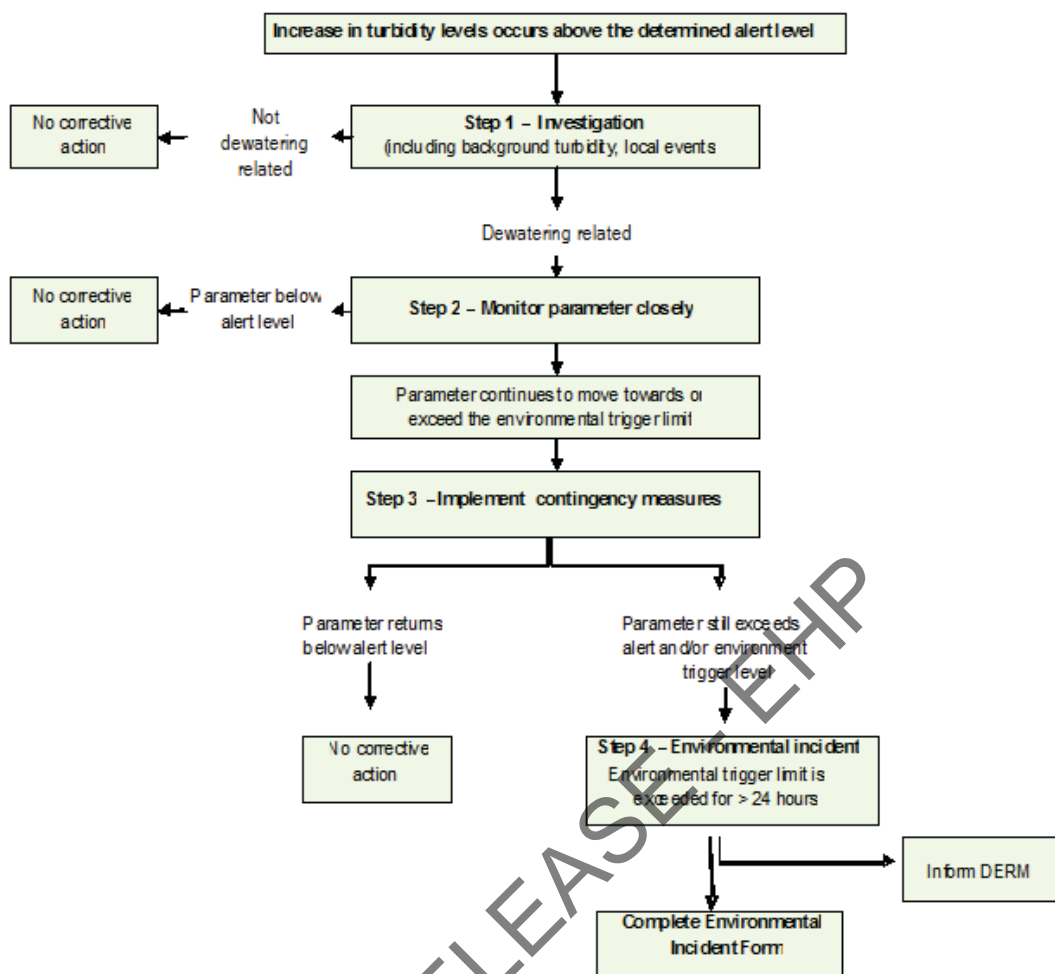
- Alert level – a specified value (e.g., of turbidity, Electrical Conductivity or pH) which acts as an 'early warning' and, if breached, initiates investigation and contingency measures to be launched into the possible causes of the levels exceeding the set range
- Environmental trigger limit (threshold value) – the upper level that a parameter can reach
- Discharge limit – the level or range set by DERM that a specified parameter can be discharged at from the discharge point

The robust monitoring program and contingency response during the dewatering activity will appropriately manage the potential environmental impacts related to water quality disturbance and ensure the potential impacts are adequately managed.

Alert levels and environmental trigger limits for the discharge point will be agreed with DERM as set within the TEP conditional requirements specific to the Isaac Plains Coal Mine dewatering activities. It is the intention of this program to utilise EC as the primary indicator as it is a direct "real time" measure rather than a calculated laboratory value.

For each of the monitoring elements, different and activity specific contingency measures will be utilised if the alert and environmental trigger levels are breached. In general, the contingency measure flowchart that will be utilised by the TEP will follow as per Figure 4.

Figure 4: Contingency Flowchart for Turbidity & EC Alert and Environmental Trigger Level Exceedances



Contingency Procedures

These contingency procedures apply to exceedances of alert levels and environmental trigger levels at the TEP monitoring and discharge locations.

Step 1: Investigation

If an increase in turbidity, EC or pH levels above the determined alert level does occur, then an investigation (in accordance with the ANZECC & ARMCANZ 2000 methodology) will commence into the reasons behind the exceedance. The investigation will consider:

- Examination of the monitoring equipment to determine if any interference has occurred, (i.e., extreme low tide, particles lodged on the probe such as debris or salt).
- Analysis of background turbidity/EC/pH levels and discharge parameter levels (as appropriate) in order to place exceedance in local context including comparison between discharge turbidity/EC/pH levels and levels recorded at the reference sites.
- Spot monitoring of parameter levels at upstream locations to determine any upstream impacts and any unusual events upstream of site that may have impacted on turbidity, EC or pH.

- Recent weather conditions and/or unusual events surrounding Isaac Plains Coal Mine, and areas of Smokey Creek, Billy's Gully, and Isaac River that may have impacted upon parameter levels.
- Consideration of any other anomalies present in the environment at the time

Step 2: Monitor parameter closely

If the above investigation results in the dewatering activities being determined to be the likely cause of increased turbidity levels:

- a. The parameters continue to exceed the alert level; the parameter will be monitored closely. If the parameter continues to move towards the environmental trigger limit one or more of the below contingencies will be actioned.

Or

- b. The parameters exceed the environmental trigger limit, one or more of the below contingency measures will be actioned immediately.

Step 3: Implement contingency measures

The Environment & Community Coordinator is required to contact the Dewatering Supervisor if a parameter level continues to exceed the alert and/or environmental trigger limits. The John Holland Senior Site Executive (SSE) will be consulted regarding the implementation of the various engineering controls throughout the monitoring process.

If the parameters exceed the alert limit:

- a. For three consecutive occasions at the discharge locations; or
- b. One or more of the TEP monitoring locations.

One or more of the following contingency measures will remain in place until parameters have reduced below environmental trigger limits:

- The average rate of dewatering will decrease,
- Dewatering halted until trigger limits no longer exceed.

Step 4: Environmental Incident

If the environmental trigger limit is exceeded for greater than 24 hours due to the dewatering activities, the Environment & Community Coordinator will notify John Holland SSE and DERM immediately, and initiate response and corrective actions. The response and corrective actions will be documented by the Environment & Community Coordinator on the John Holland incident form, outlining:

1. details of the investigations carried out, and
2. actions taken to prevent environmental harm.

Following the completion of a John Holland incident form and consultation with the SSE, the following actions will be undertaken by the Environment & Community Coordinator and Dewatering Supervisor:

- The nature of the event will be investigated
- Advice may be sought from a specialist
- Monitoring results will be reviewed and additional monitoring may be undertaken if required

- The effectiveness or need for new/additional contingency measures will be reviewed
- Strategies will be identified to prevent reoccurrence
- Environmental documentation will be reviewed and revised

RTI DL RELEASE - EHP

10. CONDITIONS

In carrying out this Transitional Environmental Program, IPCM (i.e. principal EA holder's representative) will undertake all activities in accordance with the following conditions.

Undertaking the release of mine affected water

- 1 Contaminants that will, or have the potential to cause environmental harm must not be released directly or indirectly to any waters except as permitted under this Transitional Environmental Approval, unless otherwise authorised to under the *Environmental Protection Act 1994*.
- 2 The release of contaminants to waters must only occur from the release points specified in Table 2 and depicted in Figure 1 attached to this Transitional Environmental Program.
- 3 The release of contaminants to waters must not exceed the release limits stated in Table 4 at the monitoring points specified in Table 4 of this Transitional Environmental Program.
- 4 The release of contaminants to waters from the release points must be monitored at the locations specified in Table 2 and Table 3 for each quality characteristic and at the frequency specified in Table 4 and Table 5 of this Transitional Environmental Program.
- 5 If quality characteristics of the release exceed any of the trigger levels specified in Table 5 during a release event, the Transitional Environmental Program holder must compare the downstream results in the receiving waters identified in Table 6 to the trigger values specified in Table 5 and:
 - a) where the trigger values are not exceeded then no action is to be taken
 - b) where the downstream results exceed the trigger values specified Table 5 for any quality characteristic, compare the results of the downstream site to the data from background monitoring sites and
 - i) if the result is less than the background monitoring site data, then no action is to be taken or
 - ii) if the result is greater than the background monitoring site data, complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology, into the potential for environmental harm and provide a written report to the administering authority, outlining
 - 1) details of the investigations carried out
 - 2) actions taken to prevent environmental harm.
- 6 If an exceedance in accordance with condition 5(a)(ii)(2) is identified, the holder of the Transitional Environmental Program must notify the administering authority within 24 hours of receiving the result. The notification must include written verification of the exceedance forwarded to the administering authority either via facsimile (07 49822568) or email to Manager.MiningCWR@derm.qld.gov.au.

Contaminant Release Events

- 7 Notwithstanding any other condition of this Transitional Environmental Program, the release of contaminants to waters must only take place during periods of natural flow events specified as minimum flow in Table 8 for the contaminant release point(s) specified in Table 2.
- 8 The daily quantity of discharge released from each release point must be measured and recorded at the monitoring points in Table 2.

Erosions and Sediment Control

- 9 Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.
- 10 Erosion protection must be designed, installed and maintained at each release point authorised by this Transitional Environmental Program and must:
 - a) designed and constructed by a suitably qualified and experienced person, and
 - b) be inspected by a suitably qualified and experienced person
 1. prior to the commencement of dewatering operations; and
 2. following the cessation of release in accordance with the conditions of this Transitional Environmental Program.
- 11 The holder of this Transitional Environmental Program must provide a report to the administering authority within 10 business days following the cessation of release of mine affected water authorised under authority of this Transitional Environmental Program. The report must detail the performance of erosion protection measures, including:
 - a) identification of erosion, slumping and scour impacts to vegetation,
 - b) rehabilitation, including earthworks, scour protection and flow velocity controls undertaken to minimise environmental harm, and

- c) detailed engineering assessment of erosion protection works completed to date and any proposed works to be undertaken.

Notification of Release Events

- 14 The Transitional Environmental Program holder must notify the administering authority within 24 hours of having commenced releasing mine affected water to the receiving environment. Notification must include the submission of written verification to the administering authority (either via facsimile (07 49822568) or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:
 - a) release commencement date/time
 - b) expected release cessation date/time
 - c) release point/s
 - d) release volume (estimated)
 - e) receiving water/s including the natural flow rate
 - f) any details (including available data) regarding likely impacts on the receiving water(s).
- 15 The Transitional Environmental Program holder must provide the administering authority daily during the release of mine affected water, in writing (either via facsimile (07 49822568) or email to Manager.MiningCWR@derm.qld.gov.au) of the following information:
 - a) all in situ monitoring data for that day
 - b) the receiving water flow rate
 - c) the release flow rate.
- 16 The Transitional Environmental Program holder must notify the administering authority as soon as practicable, (no later than within 24 hours after cessation of a release) of the cessation of a release notified under condition 14 and within 28 days provide the following information in writing:
 - a) release cessation date/time
 - b) natural flow volume in receiving water
 - c) volume of water released
 - d) details regarding the compliance of the release with the conditions of this Transitional Environmental Program (i.e. contamination limits, natural flow, discharge volume)
 - e) all in-situ water quality monitoring results
 - f) any other matters pertinent to the water release event.

Monitoring Requirements

- 17 Where monitoring is a requirement of this Transitional Environmental Program, ensure that a competent person(s) conducts all monitoring.
- 18 All monitoring undertaken as a requirement of this Transitional Environmental Program must be undertaken in accordance with the administering authority's Water Sampling Manual.

Notification of emergencies, incidents and exceptions

- 19 As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this Transitional Environmental Program, the administering authority must be notified of the release by telephone, facsimile or email.
- 20 The notification of emergencies or incidents must include but not be limited to the following:
 - a) the holder of the Transitional Environmental Program
 - b) the location of the emergency or incident
 - c) the number of the Transitional Environmental Program
 - d) the name and telephone number of the designated contact person
 - e) the time of the release
 - f) the time the holder of the Transitional Environmental Program became aware of the release
 - g) the suspected cause of the release
 - h) the environmental harm caused, threatened, or suspected to be caused by the release, and
 - i) actions taken to prevent any further release and mitigate any environmental harm caused by the release.
- 21 Not more than fourteen days following the initial notification of an emergency or incident, written advice must be provided of the information supplied to the administering authority in relation to:
 - a) proposed actions to prevent a recurrence of the emergency or incident, and
 - b) outcomes of actions taken at the time to prevent or minimise environmental harm.
- 22 The holder of this Transitional Environmental Program must submit daily reports of in-situ water quality monitoring to the Administering Authority.

- d) 23 The holder of this Transitional Environmental Program must submit a report to the administering authority on the **fifth business day of each month** detailing:
- e) a) all activities undertaken under the Transitional Environmental Program,
 - f) b) b) how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
 - g) i. the best practice environmental management for the activity, and
 - h) ii. the risks of environmental harm being caused by the activity, and
 - i) c) how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program.
- j) 24 The holder of this Transitional Environmental Program must submit a report to the administering authority **by 27 May 2011** including:
- k) a) details of the completion of the Transitional Environmental Program,
 - l) b) details on all activities undertaken under the Transitional Environmental Program,
 - m) c) identification of how the Transitional Environmental Program holder has met the objectives of the Transitional Environmental Program, taking into account:
 - n) i. the best practice environmental management for the activity, and
 - o) ii. the risks of environmental harm being caused by the activity,
 - p) d) identification of how the Transitional Environmental Program holder has complied with all conditions contained within the Transitional Environmental Program, and
 - q) e) confirmation that at closure of the Transitional Environmental Program, the holder will be able to comply with the conditions of the current Environmental Authority issued for Isaac Plains Coal Mine, located at Mining Lease ML70342 and the *Environmental Protection Act 1994*.

11. NOTES FOR THE CLIENT

These regulatory requirements of Chapter 4 of the *Environmental Protection Regulation 2008*, the Standard Criteria and the requirements of EP Act.

In deciding to accept or refuse a TEP the administering authority is required to consider section 338 of the EP Act, which states:

338 Criteria for deciding draft program

(1) In deciding whether to approve or refuse to approve the draft program or the conditions (if any) of the approval, the administering authority—

(a) must comply with any relevant regulatory requirement; and

(b) subject to paragraph (a), must also consider the following—

(i) the standard criteria;

- *The principles of ecological sustainable development as set out in the 'National Strategy for Ecologically Sustainable Development'.*
- *Any applicable environmental protection policy.*
- *Any applicable Commonwealth, State or local government plans, standards, agreements or requirements.*
- *Any applicable environmental impact study, assessment or report.*
- *The character, resilience and values of the receiving environment.*
- *All submissions made by the applicant and submitters.*
- *The best practice environmental management for activities under any relevant instrument, or proposed instrument, as follows – a transitional environmental program.*
- *The financial implications of the requirements under an instrument, or proposed instrument, mentioned in paragraph (g) (above) as they would relate to the type of activity or industry carried out, or proposed to be carried out, under the instrument.*
- *The public interest.*
- *Any applicable site management plan.*
- *Any relevant integrated environmental management system or proposed integrated environmental management system.*
- *Any other matter prescribed under a regulation.*

(ii) additional information given in relation to the draft program;

(iii) the views expressed at a conference held in relation to the draft program.

As has been demonstrated a significant consideration for the draft TEP is for the standard criteria. Recommendations in relation to a submission of a draft TEP in line with section 338 and the standard criteria are:

- Provide all relevant stakeholders, which may included Local Government and potentially affected landholders, with a copy of the draft TEP, and allow sufficient time for relevant stakeholders to provide comment for consideration.
- The applicant is required to consider Environmental Protection Policies, the character, resilience and values of the receiving environment, any applicable plans and standards, such as ANECC (aquatic ecosystem guidelines), the Queensland Water Quality Guidelines and 'A study of the cumulative impacts on water quality of mining activities in the Fitzroy River Basin'.

In accordance with the legislation, the submitted TEP must adequately address methods to reduce environmental harm (Section 330) and must meet the content requirements detailed in section 331.

REFERENCES

State legislation

- Environmental Protection Act 1994
- Environmental Protection (Water) Policy 2008
- Water Act 2000
- Water Regulation 2002

Standards / codes

Relevant Guidelines and Codes

- EPA (1999), *Water Quality Sampling Manual* (3rd edition). Queensland Government: Brisbane.
- ANZECC (2000), *Guidelines for Fresh and Marine Water Quality*. Australia and New Zealand Environment Conservation Council
- AS 5667.1: 1998 *Water Quality and Sampling – Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples*
- AS 5667.9: 1998 *Water Quality and Sampling – Guidance of sampling from marine waters*
- AS 5667.11: 1998 *Water Quality and Sampling – Guidance on sampling of groundwaters*

Other TEP relevant guidelines and codes

- IECA (2008), *Best Practise Erosion & Sediment Control*. International Erosion Control Association
- EPA (2009), *A study of the cumulative impacts on water quality of mining activities in the Fitzroy River Basin*. Queensland Government: Brisbane.
- Queensland Government (2010), *Water Resource (Fitzroy Basin) Plan 2010* (Consultation Draft)
- DERM (2009), *Queensland Water Quality Guidelines 2009* (Version 3). Queensland Government: Brisbane.

APPENDIX

- Water Quality Monitoring Results



PTY LTD

ACN 070 058 525

Water Holding Structure Records

Isaac Plains

Date Sampled: 13-12-10
By: Jackie Richters

Structure	Time	pH	EC μS/cm	Temp °C	Turbidity NTU	Level / Comments
Release Dam 1	2:05	7.63	735	33.8	163.2	
Release Dam 2	2:10	8.27	1095	32.9	66.8	
S1 Pit	3:40	8.47	201	30.1	100.8	
N1 Pit	3:50	8.24	223	29.5	188.2	
Isaac Plains River Upstream	12:25	7.52	243	29.7	133.8	
Isaac Plains River Downstream	1:00	7.24	298	29.2	178.5	

Isaac Plains: sch4p3(3) Prejudice the protection of an individuals right to privacy

Property Contacts

-
- sch4p3(3) Prejudice the protection of an individuals right to privacy
-

Quarterly Dam Bottles (per sample):

- 1 x 1L poly green
- 1 x 250ml poly purple
- 2 x 60ml poly red metals (total and dissolved)
- 2 x 125ml ultra trace metals (total and dissolved)
- 1 x 100ml amber glass orange
- 2 x 40ml maroon glass vials
- VOC Trip blank

Commercial in Confidence

GRAB SAMPLES – STREAM RECORDS
Isaac Plains

Date Sampled:

By:

Structure	Time (24hr)	pH	EC μ S/cm	Temp $^{\circ}$ C	Turbidity NTU	Level / Comments
Billy's Gully Upstream	3:45	7.74	271	32.6	735	Collect Duplicate
Billy's Gully Down Stream	2:20	7.75	300	33.4	2944	
Smoky Creek Upstream	3:45	7.90	284	31.1	1007	
Smoky Creek Down Stream	2:15	7.88	286	32.4	1052	

Isaac Plains sch4p3(3) Prejudice the protection of an individuals right to privacy

Eagle Downs sch4p3(3) Prejudice the protection of an individuals right to privacy

Property Contacts

-
- sch4p3(3) Prejudice the protection of an individuals right to privacy
-

Bottles (per sample):

- 1 x 1L poly green
- 1 x 250ml poly purple
- 2 x 60ml poly red metals (total and dissolved)
- 2 x 125ml ultra trace metals (total and dissolved)
- 1 x 100ml amber glass orange
- 2 x 40ml maroon glass vials

Commercial in Confidence

Site	Date	Time	Insitu pH	Insitu EC	Insitu Temp.	Turbidity	Laboratory Results									
							(24 hr)	(IESA)	(IESA)	(IESA)	(IESA)	pH Value	Electrical	Suspended Solids	Turbidity	Sulfate as
													Conductivity @			
			pH Unit	µ S/cm	degrees C	NTU	pH Unit	25°C	mg/L	NTU	mg/L					
Trigger Level (End of pipe contaminant release limits)			6.5 - 9.0	1500		/	6.5 - 9.0	1500			1000					
Trigger Level (Receiving waters contaminant trigger Levels)			6.5 - 8.0	1000		/	6.5 - 8.0	1000			1000					
Feb-10																
Billy's Gully Upstream	1/02/2010	12:30					7.84	188	392	2200	7					
Billy's Gully Downstream	1/02/2010	13:10					7.83	199	759	2400	7					
Smoky Creek Upstream	1/02/2010	11:15					7.48	116	843	1200	3					
Smoky Creek Downstream	1/02/2010	-					7.12	267	3080	4800	11					
Aug-10																
Billy's Gully Upstream	11/08/2010															
Billy's Gully Downstream	11/08/2010															
Smoky Creek Upstream	11/08/2010		8.24				7.58	89	1700	950	1					
Smoky Creek Downstream	11/08/2010		8.9				8.6	233	9100	7300	11					
Nov-10																
Billy's Gully Upstream	17/11/2010	8:00	7.66	490	19	Lab to determine										
Billy's Gully Upstream (duplicate)	17/11/2010	8:00	7.70	490	17											
DNRE1	17/11/2010	8:30	7.55	552	20											
Billy's Gully Upstream	18/11/2010	7:18	7.18	372	22											
Billy's Gully Downstream	18/11/2010	7:49	7.49	503	22											
Smoky Creek Upstream	18/11/2010	8:10	8.10	246	22											
Smoky Creek Downstream	18/11/2010	7:09	7.09	813	21											
Dec-10																
Billy's Gully Upstream	13/12/2010	15:45	7.74	271	33	735										
Billy's Gully Downstream	13/12/2010	14:20	7.75	300	33	944										
Smoky Creek Upstream	13/12/2010	15:45	7.90	284	31	1007										
Smoky Creek Downstream	13/12/2010	14:15	7.88	286	32	1052										
Isaac River Upstream	13/12/2010	12:25	7.52	243	30	1338										
Isaac River Downstream	13/12/2010	13:00	7.24	208	29	1785										

- Isaac Plains Site Layout Plan



Figure 2, N1 Pit Monitoring Points

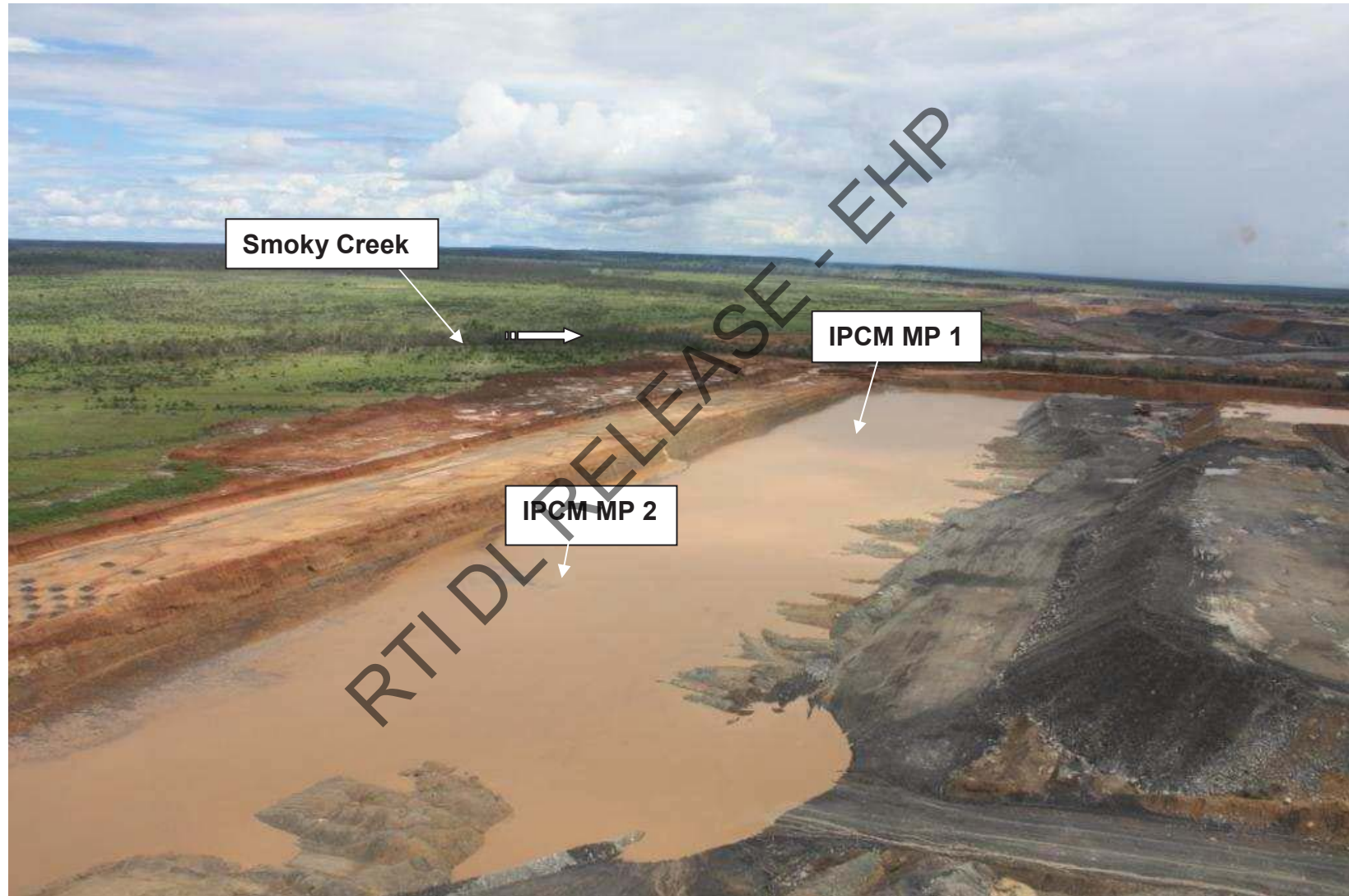


Figure 3, S1 Pit Monitoring Point



GRAB SAMPLES – STREAM RECORDS

Isaac Plains

Date Sampled:

By:

Structure	Time (24hr)	pH	EC $\mu\text{S/cm}$	Temp $^{\circ}\text{C}$	Turbidity NTU	Level / Comments
Billy's Gully Upstream	3:45	7.74	271	32.6	735	Collect Duplicate
Billy's Gully Down Stream	2:20	7.75	300	33.4	1944	
Smoky Creek Upstream	3:45	7.90	284	31.1	1007	
Smoky Creek Down Stream	2:15	7.88	286	32.4	1052	

Isaac Plains: Lynden Orr Mobile Prejudice the protection of an individuals right to privacy

Eagle Downs: Dave Grammer Mobile Prejudice the protection of an individuals right to privacy

Property Contacts

-
-
- sch4p3(3) Prejudice the protection of an individuals right to privacy

Bottles (per sample):

- 1 x 1L poly green
- 1 x 250ml poly purple
- 2 x 60ml poly red metals (total and dissolved)
- 2 x 125ml ultra trace metals (total and dissolved)
- 1 x 100ml amber glass orange
- 2 x 40ml maroon glass vials

Commercial in Confidence

Site	Time	pH	EC	temp	turbidity
IP River Up	12:25	7.52	243	29.7	1338
IP River Down	1:00	7.24	208	29.2	1785
N1 Pit	3:50	8.24	223	29.5	1882
S1 Pit	3:40	8.47	201	30.1	1668
RD1	2:05	7.63	735	33.8	163.2
RD2	2:10	8.27	1095	32.9	66.8