27A DRAFT ENVIRONMENTAL MANAGEMENT PLAN (MINING ACTIVITIES)

27A.1 INTRODUCTION

27A.1.1 PURPOSE OF THIS EM PLAN

This Environmental Management Plan (EM Plan) has been prepared to support an application by the Wandoan Joint Venture (WJV) for an Environmental Authority (Mining Activities) for the coal mining project to be comprised of Mining Lease Applications (MLA) 50229, 50230, and 50231 in accordance with sections 202 and 203 of the *Environmental Protection Act 1994* (EP Act). The EM Plan aims to identify the proposed Environmental Authority conditions that should be applied to this application and to guide preparation of Plans of Operations over the period in which mining activities are undertaken.

This EM Plan is part of the EIS and Supplementary EIS prepared for the Project under Part 4 of the *State Development Public Works Organisation Act 1971* (SDPWO Act).

The EM Plan has been revised to respond to submissions made in relation to the EIS and to reflect other matters addressed in the Supplementary EIS.

Environmental Authority conditions are determined after considering the application documents, including the EIS and the Supplementary EIS of which this EM Plan is part, and any relevant regulatory requirement. For example, those contained in relevant Environmental Protection Policies and the standard criteria as outlined in Schedule 3 of the EP Act.

The Environmental Protection Agency's (now Department of the Environment and Resource Management (DERM) guidelines "Preparing an environmental management overview strategy (EMOS) for non-standard mining projects" and "preparing an Environmental Management Plan for a non-standard exploration permit or mineral development licence" were consulted during the preparation of this EM Plan. However, as explained in Section 27A.1.2, aspects discussed in detail elsewhere in the EIS and the Supplementary EIS are not repeated in this chapter. This EM Plan has been prepared in accordance with sections 202 and 203 of the EP Act and meets the substantive requirements of the Terms of Reference for an environmental management plan for the mining activities to be undertaken on the areas to which the MLA applies (MLA areas).

27A.1.2 THE PROJECT

The Wandoan Coal Project (the Project), its location, the mining leases applied for, the tenure, description of land on which the mining activities are to be carried out, all mining activities proposed, the environmental values likely to be impacted by the mining activities and the assessed potential adverse or beneficial impacts of the mining activities on those environmental values, have been comprehensively described in earlier chapters of the EIS and the Supplementary EIS and are not repeated in this EM Plan. Where relevant, this EM Plan includes summaries of, and references to, chapters of the EIS and the Supplementary EIS.

In response to certain submissions made regarding the EIS and also in response to further information and data obtained for the purposes of the Supplementary EIS, some refinements and/or modifications to the Project, as described in the Supplementary EIS, have been made. Also, the scheduling of when particular mining activities are to be undertaken has altered, in particular to allow monitoring to be undertaken before those mining activities are undertaken. There are also some mineral resources within the MLA areas which are likely to be mined in the future, but which are not the subject of this application for an Environmental Authority (Mining Activities). These are described as Potential Mining Areas.

The refinements and/or modifications and the proposed scheduling changes are described in detail in Chapter 6 of the Supplementary EIS. This EM Plan takes those matters into account.

27A.1.3 THE PROPONENT

The Proponent for the Project, and the applicant for the Environmental Authority, is the Wandoan Joint Venture (WJV), which includes Xstrata Coal Queensland Pty Ltd (XCQ) (75%), ICRA Wandoan Pty Ltd (12.5%), and Sumisho Coal Australia Pty Ltd (12.5%).

27A.1.4 PROJECT MINING ACTIVITIES

Key elements of the Project associated with the MLA areas and immediate surrounds are generally depicted on Figure 27A-1-SV1.3, otherwise known as the Mining Activities Plan. Note that figures with numbering ending in V1.3 refer to figures contained in Volume 1, Book 3 of the EIS while Figures with numbering ending in SV1.3 refer to Figures contained in Volume 1, Book 3 of the Supplementary EIS.

The mining activities that are the subject of this EM Plan are:

- coal mining (under the Mineral Resources Act 1989) by a series of open cut pits
- prospecting and exploration (under the Mineral Resources Act 1989) necessary or desirable for such mining
- processing the extracted minerals
- all activities directly associated with or which facilitate or support the mining, prospecting, exploring or processing activities
- all activities to rehabilitate, remediate or prevent environmental harm because of those activities as generally described on the Mining Activities Plan.

Identified components of these mining activities (including corresponding environmentally relevant activity (ERA) numbers under the Environmental Protection Regulation 2008) include:

- construction activities and services
- exploration, geotechnical assessment and initial mining
- site preparation including vegetation clearing, topsoil stripping, storage or spreading, overburden removal and disposal
- blasting of overburden and coal
- excavation of run of mine (ROM) coal
- mine pits
- water supply, storage and distribution for the Project
- electricity generation (ERA 14) and supply which may include gas-fired power generation
- fuel burning (ERA 15)
- light vehicle roads and heavy vehicle haul access roads
- water management system (WMS)
- water course diversions and associated offstream flood storages
- mine infrastructure area (MIA) including:
  - chemical fuel and oil storage facilities (ERA 8)
  - maintenance workshops and vehicle washdown facilities
  - dragline construction and maintenance area
  - abrasive blasting (ERA 17)
  - boiler making or engineering (ERA 18)
  - surface coating (ERA 38)
  - concrete batching (ERA 43)
  - waste transfer stations for segregation and temporary storage of waste, with waste to be disposed of outside the MLA areas unless otherwise stated
  - administration offices and associated amenities
  - telecommunication infrastructure.
- asphalt manufacturing (ERA 6)
- mineral processing (ERA 31)
- coal handling and preparation plant (CHPP)
- coal (ROM and product) stockpiles
- main gate and security building

- storage areas for topsoil
- beneficial reuse of clean fill material, such as fill for roads within the MLA areas
- beneficial reuse of tyres and green waste within the MLA areas
- dump stations and overland conveyor systems
- mineral waste storage facilities (including tailings storage facilities)
- rail spur and loading facilities
- explosives storage
- in-field fuel facilities
- site rehabilitation and stabilisation
- all other activities not described separately, but which are directly associated with or facilitate or support the described activities
- rehabilitating or remediating environmental harm because of any of the described mining activities
- actions to prevent environmental harm because of any of the described activities.

Elements related to the Project located outside the MLA areas (which may be dependent on agreements being concluded with other parties) include:

- establishment of a new waste management facility
- upgrade to the Wandoan waste water treatment plant
- upgrade to the Wandoan potable water treatment plant
- gas pipeline connection to Peat-Scotia lateral gas line
- potential power supply via an electricity transmission line
- accommodation facilities
- upgrade to a nearby aerodrome or a new airstrip
- water supply pipelines.

If agreements are not concluded for these related elements, it is possible that some or all of these elements will be undertaken on the MLA areas. If that is the case, an application for amendment of the Environmental Authority (Mining Activities) will need to be made at the relevant time to include the particular mining activity involved.

27A.1.5 MINING LEASE APPLICATION AREAS AND REAL PROPERTY DESCRIPTIONS

There are three mining lease applications (refer Figure 6-1-V1.3):

- MLA 50229 (17,211 ha)
- MIA 50230 (11,101 ha)
- MLA 50231 (3,795 ha).

The MLA areas are comprised of allotments with the following tenures (refer Figure 8-2-V1.3):

- MLA 50229:
  - freehold tenure: 22 allotments
  - leasehold tenure: 13 allotments (typically comprising grazing homestead freehold leases and perpetual leases)
  - reserves: 2 allotments
  - unallocated State land: 1 allotment.
- MLA 50230:
  - freehold tenure: 35 allotments
  - leasehold tenure: 5 allotments (typically comprising agricultural farm leases)
  - reserves: 2 allotments.
- MLA 50231:

- freehold tenure: 11 allotments
- leasehold tenure: 3 allotments
- reserves: 1 allotment.

Land tenure details for properties included in the MLA areas are summarised in Chapter 8 Land Use of the EIS and of the Supplementary EIS.

As described in Chapter 6 of the Supplementary EIS, it is proposed that the areas of each proposed mining lease application will be reduced. Figure 6-1-SV1.3 and the Figure 17A-1-SV1.3 (Mining Activities Plan) shows the proposed revised boundary changes.

27A.1.6 PROJECT STAKEHOLDERS

Consultation for the Project, including consultation for the EIS and the Supplementary EIS commenced in 2007 and is ongoing.

A program of community and stakeholder consultation was developed to seek feedback about the Project from the local communities of Wandoan, Taroom, Miles and the broader Western Downs Regional Council area. A range of consultation activities have been undertaken throughout the Project's prefeasibility and EIS phases. This was to ensure that all issues and concerns raised by the community and stakeholders were incorporated into technical studies and further planning for the Project. Consultation was undertaken with:

- potentially affected property owners
- Commonwealth, State and Local government authorities, agencies and local elected representatives
- local utility and service providers
- environmental organisations
- local community organisations
- local industry groups
- Traditional Owner groups/organisations
- the broader community.

Consultation undertaken since publication of the EIS in December 2008 is described in Chapter 4 of the Supplementary EIS, but briefly included:

- copies of the Integrated EIS Summary were sent to affected landholders, elected representatives, non-government organisation (NGO) stakeholders, the community reference group, traditional owners and other key community members in December 2008
- fact sheets were produced and distributed during December 2008 and made available for display at various locations
- advertisements regarding the EIS appeared in a number of newspapers
- public meetings were held in Miles, Wandoan and Taroom from 9-11 December 2008 and a further meeting was held in Wandoan on 22 April 2009
- information sessions for directly affected property owners were held in Wandoan on 20 January and 22 April 2009
- consultation with individual landholders continued
- community reference group meetings were conducted in Wandoan on 8 December 2008 and 22 April 2009
- the WJV provided an information display at both the Wandoan Show (20 and 21 April 2009) and the Taroom Show (4 and 5 May 2009)
- since December 2008 an Xstrata Coal shopfront, open to the public 20 hours per week, has been located in Wandoan.

27A.2 ENVIRONMENTAL PROTECTION COMMITMENTS, CONTROL STRATEGIES AND PROPOSED EA CONDITIONS

The Project will comprise a level 1 mining project as defined in the EP Act and accordingly no code of environmental compliance and no standard environmental conditions will apply to the Project's mining activities.

This EM Plan identifies the environmental protection commitments required by section 203 of the EP Act that the WJV proposes for the mining activities to protect or enhance relevant environmental values under best practice environmental management, while allowing for development in accordance with the object of the EP Act. These commitments will assist in determining both the EA conditions and the levels of impact from the Project's mining activities on key environmental values to be authorised by the Environmental Authority.

The broad environmental protection and other commitments which the Proponent has adopted for the Project have been summarised in Chapter 28 Summary of Commitments and Mitigation Measures. Those commitments and mitigation measures reflect the policies of the Proponent in undertaking the Project.

The commitments in this EM Plan will guide the preparation of Plans of Operations during the life of the Project as well as action programs included in all Plans of Operations as required under s 234 of the EP Act which are expected to include a number of the operational and design strategies and measures identified in various chapters of the EIS and Supplementary EIS, and summarised in Chapter 28. It is anticipated that other control strategies and/or measures, which achieve a similar level of mitigation, will be developed over the life of the Project.

General commitments, control strategies, operational and design measures summarised in Chapter 28 of the EIS and Supplementary EIS, if relevant to the mining activities, are referred to in this EM Plan. Measures considered to be of key significance have been included in the draft Environmental Authority conditions.

27A.2.1 GENERAL CONDITIONS

There are a number of Environmental Authority conditions which may be required under the EP Act or which are of general application to the management of the environmental impacts for the Project. The proposed general conditions are set out below.

Schedule A – Mining activities to be authorised

The mining activities to be carried out under this authority are:

- mining (under the Mineral Resources Act 1989) by a series of open cut pits
- prospecting and exploration (under the Mineral Resources Act 1989) necessary or desirable for such mining
- processing the extracted minerals
- all activities directly associated with or which facilitate or support the mining, prospecting, exploring or processing activities
- all activities to rehabilitate, remediate or prevent environmental harm because of those activities;

as generally described on the Mining Activities Plan.

Schedule A – General financial assurance

A-1 Provide a financial assurance to the Administering Authority as security for compliance with this Environmental Authority in the amount and form determined in accordance with the Environmental Protection Act 1994 prior to the commencement of activities proposed under this Environmental Authority.

A-2 The financial assurance is to remain in force until the Administering Authority is satisfied that no claim on the assurance is likely.

Maintenance of measures, plant and equipment

A-3 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

b) that such measures, plant and equipment are maintained in a proper condition

c) that such measures, plant and equipment are operated in a proper manner.

Monitoring

A-4 Record, compile and keep for a minimum of five years (which may be done electronically) 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.

A-5 Where monitoring is a requirement of this Environmental Authority, ensure that a competent person(s) conducts all monitoring using equipment that is accurately calibrated and maintained in good working order.

A-6 Two meteorological stations to continuously measure and record wind speed and direction, humidity, temperature, barometric pressure and rainfall to be established and maintained for the life of the Project at the locations approximately marked on the Mining Activities Plan unless the data is available, for that location, from a similar meteorological station operated by the Bureau of Meteorology or other reputable body.

Storage of flammable and combustible liquids

A-7 All flammable and combustible liquids stored prior to use, must be contained within an on-site containment system constructed and maintained in accordance with relevant sections of AS 1940:2004 - Storage and Handling of Flammable and Combustible Liquids, or the latest version thereof applying when the particular containment system is constructed.

Complaint response

A-8 All complaints received relating to carrying out the mining activities shall be investigated with the following details to be recorded (and this may be done electronically):

- time and date of complaint
- type of communication (telephone, letter, personal etc.)
- name, contact address and contact number of the complainant if provided
- response and investigation undertaken as a result of the complaint
- name of person responsible for investigating complaint
- action taken as a result of the complaint investigation.

Notice to Administering Authority

A-9 As soon as is reasonably practicable after becoming aware of an emergency or incident which results in the release of contaminants not in accordance with the conditions of this authority notice shall be given to the Administering Authority of such release by telephone, facsimile or email.

Definitions

A-10 Words or phrases used in this Environmental Authority have the same meanings as the same words or phrases when used in the Environmental Protection Act 1994, its Regulations or Environmental Protection Policies but otherwise have the meanings stated in Schedule H.

27A.2.2 AIR

Summary of values and impacts

This section summarises the potential impacts of the mining activities on the environmental values of the existing air environment (which are described in detail in Chapter 13 of the EIS and Supplementary EIS). It also states the environmental protection commitments including objectives, standards, indicators and control strategies proposed by the WJV.

Since publication of the EIS, the Environmental Protection (Air) Policy 2008 (EPP (Air)), came into effect on 1 January 2009, and the Supplementary EIS addressed the application of that policy to the Project.

The change of most significance for the Project is the reduction from 150 µg/m^3 to 50 µg/m^3 (averaged over 24 hours) of the air quality objective for Particulate matter (diameter <10 µm) (PM_{10}). The Supplementary EIS has discussed the basis on which this level was determined and has explained that the level has been set by reference to health risks associated with an urban rather than a rural environment such as the one in which the Project is located. The health risks are higher in the urban environment because of the nature of the particulates involved there, mainly consisting of fine particles being the products of combustion, vehicles and other sources. Dust originating from crustal matter, the prime source of particulates in a rural area, is inherently different in composition from particulates emitted from combustion and generally comprises coarse particles.

The purpose of the EPP (Air) is to achieve the object of the EP Act in relation to the air environment, being the protection of Queensland's air environment while allowing for development that improves Queensland's total quality of life, both now and in the future, in a way that maintains the ecological processes on which life

depends. Against the framework of achieving that object, the EPP (Air) identifies the following environmental values of the air environment to be enhanced or protected:

- health and biodiversity of ecosystems
- human health and wellbeing
- aesthetics of the environment
- agricultural use of the environment.

The EIS and the Supplementary EIS have determined that the air quality indicators (under the EPP (Air) potentially adversely affected by the Project's mining activities are:

- carbon monoxide (Power station emission)
- nitrogen dioxide (Power station emission)
- particulate matter (PM) (from mining and construction activities)
- dust deposition rate (from mining and construction activities).

The EIS and the Supplementary EIS have also determined that environmental nuisance may be contributed to by dust generated in carrying out the mining activities.

However these reports have concluded that while the Project's mining activities are being undertaken, none of the air quality objectives in the EPP (Air) for the indicators mentioned above will be exceeded at any sensitive receptors except for the objective for Particulate matter (diameter <10 µm) (PM_{10}) namely, 50 µg/m^3 averaged over 24 hours. This objective will be exceeded at some, but not all, receptors.

The EPP (Air) allows this value to be exceeded on five days per year.

The reports have also concluded that while the Project's mining activities are being undertaken, the annual dust deposition rate of 120 mg/m^2/day will not be exceeded at any sensitive receptor. While this rate does not appear in the EPP (Air) as an air quality objective, it is proposed for the Project as an indicator that, if not exceeded at a particular sensitive receptor, an environmental nuisance is not occurring.

Table 27A-1 summarises the data which supports these conclusions for the relevant indicators other than the objective for Particulate matter (diameter <10 µm) (PM_{10}) namely, 50 µg/m^3 averaged over 24 hours.

Table 27A-1: Data supporting conclusions for relevant indicators

Model results for the Project associated with the on-site power generation options*				
Indicator	EPP (Air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined background level for indicator	Contribution by mining activities
Carbon Monoxide (Health and well being value)	11 mg/m^3 at zero degrees Celsius averaged over 8 hours.	Option 3: 1.8 mg/m^3 Option 4: 1.7 mg/m^3	Option 3 and Option 4: 1.5 mg/m^3	Option 3: 0.3 mg/m^3 Option 4: 0.2 mg/m^3
Nitrogen Dioxide (Health and well being value)	(1) 250 µg/m^3 at zero degrees Celsius averaged over 1 hour.	Option 3: 213 µg/m^3 Option 4: 148 µg/m^3	Option 3 and Option 4: 36 µg/m^3 Option 1:	Option 3: 177 µg/m^3 Option 4: 102 µg/m^3
	(2) 62µg/m^3 at zero degrees Celsius averaged over 1 year.	Option 3: 16.5 µg/m^3 Option 4: 14.9 µg/m^3	Option 3 and Option 4: 13 µg/m^3	Option 3: 3.5 µg/m^3 Option 4: 1.9 µg/m^3

Note: *Onsite gas fired power station options assessed in the EIS and Supplementary EIS: Utilising the terms in the EIS, Option 3 refers to an 80 MW power station, while Option 4 refers to a 30 MW power station. Scenarios 2 to 6 are the indicative mine plans and schedules modelled in the Supplementary EIS.

Model results for the Project of Dust for Scenario 2 - Year 1				
Indicator	EPP (Air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined background level for indicator	Contribution by mining activities
$PM_{2.5}$ (Health and well being value)	(1) 25 µg/m^3 at zero degrees Celsius averaged over 24 hours.	13.4 µg/m^3	6.8 µg/m^3	6.6 µg/m^3
	(2) 8 µg/m^3 at zero degrees Celsius averaged over 1 year.	7.2 µg/m^3	6.8 µg/m^3	0.6 µg/m^3
Total Suspended Particles (Health and well being value)	90 µg/m^3 at zero degrees Celsius averaged over 1 year.	29 µg/m^3	26 µg/m^3	3 µg/m^3
Dust (Nuisance)	120 mg/m^2/ day averaged over 1 year.	41 mg/m^2/day	35 mg/m^2/day	6 mg/m^2/day

Model results for the Project of Dust for Scenario 3 - Year 5				
Indicator	EPP (Air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined background level for indicator	Contribution by mining activities
$PM_{2.5}$ (Health and well being value)	(1) 25 µg/m^3 at zero degrees Celsius averaged over 24 hours.	19 µg/m^3	6.8 µg/m^3	12.2 µg/m^3
	(2) 8 µg/m^3 at zero degrees Celsius averaged over 1 year.	7.75 µg/m^3	6.8 µg/m^3	0.95 µg/m^3
Total Suspended Particles (Health and well being value)	90 µg/m^3 at zero degrees Celsius averaged over 1 year.	40 µg/m^3	26 µg/m^3	14 µg/m^3
Dust (Nuisance)	120 mg/m^2/ day averaged over 1 year.	50 mg/m^2/day	35 mg/m^2/day	15 mg/m^2/day

Model results for the Project of Dust for Scenario 4 - Year 10				
Indicator	EPP (Air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined background level for indicator	Contribution by mining activities
$PM_{2.5}$ (Health and well being value)	(1) 25 µg/m^3 at zero degrees Celsius averaged over 24 hours.	17.2 µg/m^3	6.8 µg/m^3	10.4 µg/m^3

	(2) 8 µg/m^3 at zero degrees Celsius averaged over 1 year.	7.5 µg/m^3	6.8 µg/m^3	0.7 µg/m^3
Total Suspended Particles (Health and well being value)	90 µg/m^3 at zero degrees Celsius averaged over 1 year.	36 µg/m^3	26 µg/m^3	10 µg/m^3
Dust (Nuisance)	120 mg/m^2/ day averaged over 1 year.	48 mg/m^2/day	35 mg/m^2/day	22 mg/m^2/day

Model results for the Project of Dust for Scenario 5 - Year 20				
Indicator	EPP (air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined background level for indicator	Contribution by mining activities
$PM_{2.5}$ (Health and well being value)	(1) 25 µg/m^3 at zero degrees Celsius averaged over 24 hours.	14 µg/m^3	6.8 µg/m^3	7.2 µg/m^3
	(2) 8 µg/m^3 at zero degrees Celsius averaged over 1 year.	7.6 µg/m^3	6.8 µg/m^3	0.8 µg/m^3
Total Suspended Particles (Health and well being value)	90 µg/m^3 at zero degrees Celsius averaged over 1 year.	36 µg/m^3	26 µg/m^3	10 µg/m^3
Dust (Nuisance)	120 mg/m^2/ day averaged over 1 year.	48 mg/m^2/day	35 mg/m^2/day	13 mg/m^2/day

Model results for the Project of Dust for Scenario 6 - Year 30				
Indicator	EPP (air) objective/dust objective	Maximum value of indicator when mining activities occur	Determined Background level for Indicator	Contribution by mining activities
$PM_{2.5}$ (Health and well being value)	(1) 25 µg/m^3 at zero degrees Celsius averaged over 24 hours.	13 µg/m^3	6.8 µg/m^3	6 µg/m^3
	(2) 8 µg/m^3 at zero degrees Celsius averaged over 1 year.	7.4 µg/m^3	6.8 µg/m^3	0.6 µg/m^3
Total Suspended Particles (Health and well	90 µg/m^3 at zero degrees Celsius averaged over 1	37 µg/m^3	26 µg/m^3	11 µg/m^3

being value)	year.			
Dust (Nuisance)	120 mg/m^2/ day averaged over 1 year.	52 mg/m^2/day	35 mg/m^2/day	17 mg/m^2/day

Table 27A–2 summarises the data for Particulate matter (diameter <10 µm) (PM_{10}) for a number of the worst affected representative receptors for all scenarios modelled in the Supplementary EIS (on the basis of mining activities only, without taking into account existing background levels).

Table 27A-2: Particulate matter – Sensitive receptors

Sensitive receptor	Year 1		Year 5		Year 10		Year 20		Year 30	
	Av	Max	Av	Max	Av	Max	Av	Max	Av	Max
MLA-106*	0.6	29.7	5	46	2.6	55	0.8	17	1.6	23
MLA-207*	0.5	22.9	8.1	84.4	2.2	62	0.7	17	1.7	18
MLA-450*	0.6	26.7	8	83	2.7	65.3	1	20.1	1.6	26
MLA-402	1.0	25.4	2.9	63.3	1.6	17	1.5	20	0.9	17
MLA-520	0.8	40.2	5.7	85.6	4.4	80.1	1.5	34.7	1.4	16
MLA-548	1.4	26.9	5	67	3.0	35	3.0	56	2.5	34
MLA-505	0.9	14.1	5.6	52	4.4	42	1.9	36.8	1.8	35.4
MLA-300	1.4	17.1	5.3	52	3.1	31.6	5.7	55.4	7.0	57.6
MLA-50	0.4	4.3	6	52	3.5	51.5	5.2	46.9	2.7	16.4
MLA-355	2.1	16.7	7.2	45.9	3.4	22	6.7	44.5	6.1	40.6
MLA-595	0.2	5.0	1	13	5.9	44	5.9	63.8	3.5	30.4
MLA-693	0.2	6.1	2	16	1.5	20.6	1.6	15	1.4	10
Accommodation facilities	2.1	22.2	1.1	8.9	1.6	15.8	1.5	10.2	1.1	7.3

Note: * indicates sensitive receptor within Wandoan Township

Table 27A–3 shows, for those representative receptors, the numbers of days on which the indicator for Particulate matter (diameter <10 µm) (PM_{10}) (50 µg/m^3 averaged over 24 hours) would be exceeded from the combination of natural events and mining activities for the mining scenarios modelled in the Supplementary EIS. This shows that the impacts for particular receptors occur over a limited period and reduce over time. The number of days exceeded ranges from 6 to 23.

Table 27A-3: Number of days 50 µg/m^3 is exceeded (natural events and mining activities)

Sensitive receptor	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6
MLA-106*	6	12	11	6	6
MLA-207*	6	23	10	6	6
MLA-450*	6	22	12	6	6
MLA-402	6	8	6	6	6
MLA-520	7	13	16	6	6
MLA-548	6	12	7	8	7
MLA-505	6	12	9	7	7
MLA-300	6	9	7	12	16
MLA-50	6	6	8	9	6
MLA-355	6	10	7	10	9
MLA-595	6	6	12	14	7
MLA-693	6	6	6	6	6
Accommodation facilities	6	6	6	6	6

Note: * indicates sensitive receptor within Wandoan Township

Under the EPP (Air) if the objectives for specific indicators are met, the relevant environmental values are protected or enhanced but if a project may cause an objective to be exceeded further analysis is required to assess if, having regard to best practice environmental management for the activity, and other requirements of the EP Act, a level of environmental harm should be authorised by the environmental authority for the activity.

The EPP (Air) also recognizes that achieving the stated air quality objectives is to be achieved progressively "over the long term" (Section 8(4) of the EPP (Air)).

The EIS and Supplementary EIS have identified the measures shown in Table 27A-6 (contained in the commitments in this section) as being relevant best practice measures to be applied in managing the impacts of particulate matter generated in undertaking the Project. These measures represent the application of the management hierarchy for air emissions from the Project, namely avoid, recycle, minimise and manage to best practice environmental management.

With the application of these measures, the EIS and the Supplementary EIS have concluded that while the Project's mining activities are being undertaken, an indicator for Particulate matter (diameter <10 µm) (PM_{10}) namely, 150 µg/m^3 averaged over 24 hours, will not be exceeded at any sensitive receptors except in extremely adverse natural weather conditions such as a dust storm. This (150 µg/m^3) was the indicator in the former Environmental Protection (Air) Policy 1997 (Former EPP Air) in force at the time of preparation and publication of the EIS.

The EIS and Supplementary EIS have identified the further measures shown in Table 27A-7 as being additional measures which could be applied in managing the impacts of particulate matter generated in undertaking the Project if monitoring showed that a trigger level below 150 µg/m^3 averaged over 24 hours, was being approached.

The Supplementary EIS recommends the undertaking of a monitoring program at representative sites and the implementation of additional measures when a trigger level for Particulate matter (diameter <10 µm) (PM_{10}), as a rolling average, of 120 µg/m^3 is reached. The Supplementary EIS has determined sites, and their corresponding upwind locations, which are representative of areas which may be impacted. These sites, upwind locations and areas are shown on Figure 27A-2-SV1.3, otherwise referred to as the Receiving Areas Plan.

As shown in the Screening Health Risk Assessment provided in Chapter 13 of the Supplementary EIS (which considers the basis for determining the ambient air particulate matter guidelines), it is recognised that:

- these guidelines have been set using data from epidemiological studies conducted in large urban populations
- these studies have demonstrated statistical associations between the concentration of fine airborne particulates ($PM_{2.5}$) and a number of health effects for sufficiently exposed susceptible sub-populations

- while some data suggests that exposure to coarse urban particulates ($PM_{10 - 2.5}$) may be associated with some health effects, this data is not conclusive
- overall, the data seems to support the conclusions that fine urban airborne particulates ($PM_{2.5}$) are likely to be more detrimental to health than coarse urban particulates ($PM_{10 - 2.5}$) and that non-occupational exposure to crustal PM is unlikely to be associated with adverse health effects.

The modelling undertaken for the EIS and the Supplementary EIS indicates that the air quality objectives for particulates $PM_{2.5}$ will not be exceeded when dust is generated in carrying out the mining activities and this seems to suggest that the risk of health effects is in fact minimised as that air quality objective is the most relevant when considering health effects.

In addition, recognising the different compositions of $PM_{10-2.5}$ particulates in the urban and rural areas (where urban particulates are significantly more likely to include toxics likely to cause health impacts), the potential health impacts of rural particulates $PM_{10-2.5}$ is less.

The Supplementary EIS also analyses the ratio of fine to coarse particulates generated by the major dust sources for the Project, and has concluded that sources likely to have the highest percentage of PM2.5 make relatively small contributions to the total dust emissions. This further supports the conclusion that the risk of adverse health effects is low.

The EIS and the Supplementary EIS have also analysed the background to the determination of the indicator for Particulate matter (diameter <10 µm) (PM_{10}) namely, 50 µg/m^3 averaged over 24 hours and have also reviewed standards from other jurisdictions. This analysis shows that the objective in the EPP (Air) is a higher standard than that which applies in, for example, the United States of America, Germany and the United Kingdom.

Taking into consideration all these factors, as well as those listed below, The EIS and Supplementary EIS have concluded that, while the Project's mining activities are being undertaken, dust generated from those activities when combined with background dust levels, if:

- not exceeding the indicator for Particulate matter (diameter <10 µm) (PM_{10}) namely, of 150 µg/m^3 averaged over 24 hours, on any occasion at any sensitive receptor outside the MLA areas (except in extremely adverse weather conditions) and
- not exceeding on more than 35 days a year at any sensitive receptor outside the MLA areas, the indicator for Particulate matter (diameter <10 µm) (PM_{10}) namely, 50 µg/m^3 averaged over 24 hours
- represents a level of environmental harm from the Project's mining activities which should be authorised by the Environmental Authority.

This conclusion has been made after consideration of:

- the measures recommended represent best practice environmental management and no further measures have been identified which could reduce the generation of dust in carrying out the mining activity
- these impacts are not likely to affect each receptor continually throughout the lifetime of the Project so that individual receptors may only be impacted for shorter periods of time while mining activities occur in their vicinity
- the particulates likely to be generated in the mining activities do not comprise the toxics found in urban areas which are more likely to contribute to health impacts
- the number of days exceeded correlates with that allowed in other jurisdictions as explained in the Supplementary EIS
- the principles of ecologically sustainable development and
- the improvement to the quality of life in Queensland which will flow from the Project as outlined in relevant Chapters of the EIS and Supplementary EIS.

Control strategies

Tables 27A-6 and 27A-7 contains the possible operational control strategies which may be applied where appropriate to achieve the air quality commitments (recognizing that equivalent or better control strategies may also be developed over the life of the Project).

Environmental protection commitments

In managing the releases of dust from all mining activities and the emissions to atmosphere of the power generation activity WJV provides the following commitments.

1) Undertake a monitoring program at the locations and their related upwind location described in Table 27A-4 which have been determined to be sites which are representative of sensitive receptors likely to be impacted by the release of dust from mining activities within the Receiving Areas also described in Table 27A-4, and as shown generally on the Receiving Areas Plan.

Table 27A-4: Monitoring programs

No.	Monitoring location	Receiving area on the receiving areas plan	Relevant upwind location
1.	MLA-106	Wandoan township	Turkey Hill AWS
2.	MLA-207	Wandoan township	Turkey Hill AWS
3.	MLA-450	Wandoan township	Turkey Hill AWS
4.	MLA-402	Leichhardt	Turkey Hill AWS/Wandoan AWS
5.	MLA-520	North Wandoan township	Turkey Hill AWS
6.	MLA-548	Woleebee South	Turkey Hill AWS/Wandoan AWS
7.	MLA-505	Woleebee South	Turkey Hill AWS/Wandoan AWS
8.	MLA-300	Woleebee West	Turkey Hill AWS/Wandoan AWS
9.	MLA-50	Mud Creek\Woleebee West	Turkey Hill AWS/Wandoan AWS
10.	MLA-355	Woleebee West\Mud Creek	Turkey Hill AWS/Wandoan AWS
11.	MLA-595	Turkey Hill	Wandoan AWS
12.	MLA-693	Mud Creek	Turkey Hill AWS/Wandoan AWS
13.	Accommodation facilities	Leichhardt	Turkey Hill AWS/Wandoan AWS

Note: AWS means Automated Weather Station

2) The monitoring program will be established at the representative locations prior to the commencement of mining activities likely to impact on the Receiving Area of which that location is representative and will continue until the mining activities likely to impact at that area have ceased.

3) Monitoring will also occur at the corresponding upwind location while monitoring of the representative location occurs.

4) If monitoring cannot be continued at a particular location for any reason (for example a refusal or withdrawal of consent by the owner) the program will be continued as soon as is reasonably practicable at an alternative location representative of the relevant Receiving Area.

5) Monitoring at each representative and upwind location will comprise:

   a) a Tapered element oscillating microbalance (TEOM) being a continuous real time monitoring system for particulate matter with an aerodynamic diameter of less than 10 micrometres (µm) (PM_{10}) suspended in the atmosphere over a 24 hour averaging time monitored in accordance with:

      i) Australian Standard AS3580.9.6 of 2003 (or subsequent editions) Ambient Air – Particulate Matter – Determination of Suspended Particulates PM_{10} High Volume – Sampler with size selective inlet – Gravimetric Method; or

      ii) any alternative method of monitoring PM_{10} which may be permitted by the Air Quality Sampling Manual as published from time to time by the Administering Authority;

   b) dust deposition monitored in accordance with Australian Standard AS3580.10.1 of 2003 (or subsequent editions).

6) Mining activities will not release dust to the extent which, with background dust levels, causes the air quality objectives described in Table 27A-5 to be exceeded at any sensitive receptor outside the ML areas (other than those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants) except in extreme weather circumstances. (Extreme weather circumstances include, for example, a dust storm).

Table 27A-5: Air quality objectives

No	Indicator	Air quality objective
1.	PM2.5	25 µg/m3 at zero degrees Celsius averaged over 24 hours.
2.	PM2.5	8 µg/m3 at zero degrees Celsius averaged over 1 year.
3.	Total Suspended Particles	90 µg/m3 at zero degrees Celsius averaged over 1 year.
4.	Dust	120 mg/m3/ day averaged over 1 year.
5.	PM10	150 µg/m3 at zero degrees Celsius averaged over 24 hours.

7) Mining activities will not release dust to the extent which, with background dust levels causes the air quality objective for particulate matter (diameter <10 µm) (PM_{10}) namely, of 50 $\mu g/m^3$ averaged over 24 hours, to be exceeded on more than 35 days a year at any sensitive receptors outside the MLA areas (other than those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants).

8) Implement the strategies or measures for dust minimisation described in Table 27A-6 (or equivalent or better strategies or measures) in relation to mining activities which are likely to contribute significantly to dust.

Table 27A-6: Strategies or measures for dust minimisation

No.	Mining Activity	Strategies or Measures
1.	Dragline Use	Restrict drop height to 5 metres
2.	Overburden Dumping by Truck	Limit to in-pit dumps
3.	Batch drop conveyor	Partial cover of chute
4.	Wash Plant	Full Cover
5.	Loading Trains	Partial cover of chute
6.	Conveyor	Partial Cover
7.	Blasting	Restrict to daylight hours
8.	Drilling Overburden	Use bag filter
9.	Haul Road Use	Regular watering at 2 litres/m2/day Maintain average vehicle speed of 40 km/h
10.	Use of Disturbed areas	Progressive revegetation when practicable
11.	Coal Loading for Transport	Profile coal surface to flat "garden bed" shape Wash product coal prior to transport to remove coal fines and other particles

9) Where monitoring has shown that the trigger level of 120 $\mu g/m^3$ for PM_{10} averaged over 24 hours has been exceeded at a monitoring location, implement, as soon as is reasonably practicable, such of the strategies or measures for dust minimisation described in Table 27A-7 (or equivalent or better strategies or measures) which are likely to ensure the objective of 150 $\mu g/m^3$ is not exceeded at that monitoring location in relation to mining activities which are likely to contribute significantly to dust at the monitoring location.

Table 27A-7: Trigger level strategies or measures

No.	Mining activity	Additional strategies or measures
1.	All mining activities	Implement a weather and dispersion forecasting system to identify adverse meteorological conditions and respond with the cessation or relocation of particular activities and/or the limitation of times during which particular activities may be undertaken while adverse conditions continue
2.	Use of active Stockpiles	Regular water spraying
3.	Truck dumping coal	Regular water spraying

No.	Mining activity	Additional strategies or measures
4.	Use of disturbed areas	Planting of a wind break
5.	Use of Haul Roads	Application of chemical suppressants to roads generating impacts Alteration of routes to increase separation distances where practicable

10) Undertake a reasonable and practicable monitoring program and provide a written report to the Administering Authority after written notice from the Administering Authority requiring the undertaking of such a program and report where the Administering Authority has received a complaint which is neither frivolous or vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer) about the impacts of dust generated by the mining activities at a specific sensitive receptor.
11) Where any monitoring undertaken in accordance with clause 5 (a) indicates that the Project air quality objective for particulate matter (diameter <10 µm) (PM_{10}) namely, of 150 µg/m^3 averaged over 24 hours, has been exceeded, investigate and provide a written report to the Administering Authority as soon as is reasonably practicable assessing whether or not that exceedance was contributed to by an extreme weather circumstance.
12) Not less than 3 months prior to the commencement of any mining activities in the Frank Creek Pit within the area described as the High Management Zone on the Mining Activity Plan, review the monitoring results required by clause 5 (a) and (b) for a period not less than 3 years, undertake further modelling of the impacts of dust generated in carrying out mining activities within the High Management Zone to determine if the requirements of clauses 6, 7 and 8 will be met while mining activities are undertaken in the High Management Zone and provide a written report to the Administering Authority about such review and modelling.
13) For the mining activity of power generation and discharges to the air environment, comply with the requirements and implement the strategies or measures described in Table 27A-8.

Table 27A-8: Power generation requirements, strategies or measures

No.	Requirement, strategy or measure
1.	Combustion Emissions will be directed through stacks not less than 21 m high and 2.08 m effective diameter
2.	Exit velocity of stack emissions will not be less than 25.5 m/s
3.	Exit temperature of stack emissions will not be less than 375 degrees Celsius
4.	Emission volumes flow from each engine will not be less than 28 m3 /s

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule–B – Air

B1-1 This authority authorises the release to the environment (air) of the contaminants generated in carrying out the mining activities only in accordance with the conditions of this Schedule B.

B1-2 The contaminants that may be released are those resulting from the operation of the sources or the activities as listed in Schedule B Table 1.

B1-3 Such contaminants may only be released from the points or areas described in Schedule B Table 1.

Schedule B: Table 1: Contaminant sources and activities – Release points or areas

Sources/activities	Release points or areas	Contaminants
Power Station	All Stacks	Products of combustion for a gas-fired power station
All Other Mining activities	The areas in which the various activities are undertaken from time to time as generally shown on the Mining Activities Plan	Dust, particulates

B1-4 Monitoring of the receiving environment (air) shall be conducted (subject to obtaining consent from the relevant owner) for dust at both the representative and upwind locations described in Schedule B Table 2 which locations are representative of the Receiving areas also shown in Schedule B Table 2. If monitoring cannot be continued at a particular location for any reason (for example a refusal or

withdrawal of consent by the owner) the program will be continued as soon as is reasonably practicable at an alternative location representative of the relevant Receiving Area.

Schedule B: Table 2: Representative and upwind locations for receiving areas

Representative location	Receiving area on receiving areas plan	Relevant upwind location
MLA-106	Wandoan township	Turkey Hill AWS
MLA-207	Wandoan township	Turkey Hill AWS
MLA-450	Wandoan township	Turkey Hill AWS
MLA-402	Leichhardt	Turkey Hill AWS/Wandoan AWS
MLA-520	North Wandoan township	Turkey Hill AWS
MLA-548	Woleebee South	Turkey Hill AWS/Wandoan AWS
MLA-505	Woleebee South	Turkey Hill AWS/Wandoan AWS
MLA-300	Woleebee West	Turkey Hill AWS/Wandoan AWS
MLA-50	Mud Creek\ Woleebee West	Turkey Hill AWS/Wandoan AWS
MLA-355	Woleebee West\Mud Creek	Turkey Hill AWS/Wandoan AWS
MLA-595	Turkey Hill	Wandoan AWS
MLA-693	Mud Creek	Turkey Hill AWS/Wandoan AWS
Accommodation facilities	Leichhardt	Turkey Hill AWS/Wandoan AWS

Note: AWS means Automated Weather Station

B1-5 Monitoring under clause B1-4 shall be of the indicators in accordance with the standards described in Schedule B Table 3.

Schedule B: Table 3: Monitoring indicators and standards

Indicator	Standard
Particulate matter with an aerodynamic diameter of less than 10 micrometres (µm) (PM10) suspended in the atmosphere over a 24 hour averaging time	Australian Standard AS 3580.9.6 of 2003 (or subsequent editions) Ambient Air – Particulate Matter – Determination of Suspended Particulates PM10 High Volume – Sampler with size selective inlet – Gravimetric Method; 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
Dust Deposition	Australian Standard AS 3580.10.1 of 2003 (or subsequent editions).

B1-6 Dust released in carrying out the mining activities will not cause, when combined with background dust levels, the air quality objectives described in Schedule B Table 4 to be exceeded at any sensitive receptor outside the MLA areas (other than those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants) except in extreme weather circumstances. (Extreme weather circumstances include, for example, a dust storm).

Schedule B: Table 4: Air quality objectives

No.	Indicator	Air Quality Objective
1.	$PM_{2.5}$	25 µg/m^3 at zero degrees Celsius averaged over 24 hours.
2.	$PM_{2.5}$	8 µg/m^3 at zero degrees Celsius averaged over 1 year.
3.	Total Suspended Particles	90 µg/m^3 at zero degrees Celsius averaged over 1 year.
4.	Dust	120 mg/m^3/ day averaged over 1 year.
5.	PM_{10}	150 µg/m^3 at zero degrees Celsius averaged over 24 hours.

B1-7 Dust released in carrying out the mining activities will not cause, when combined with background dust levels, the air quality objective for particulate matter (diameter <10 µm) (PM_{10}) namely, 50 µg/m^3 averaged over 24 hours, to be exceeded at any sensitive receptor outside the MLA areas on

more days than 35 days in any year, other than those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants.

B1-8 The holder will not be in breach of clauses (B1-6) and (B1-7) for any sensitive receptor where the monitoring undertaken pursuant to clauses (B1-4) and (B1-5) for the Representative location relevant to the Receiving Area in which the sensitive receptor is located, indicates compliance with clauses (B1-6) and (B1-7) for that location.

B1-9 Implement the strategies or measures for dust minimisation described in Schedule B Table 5 (or equivalent or better strategies or measures) in relation to the mining activities which are likely to contribute significantly to dust.

Schedule B: Table 5: Strategies or measures

No.	Mining Activity	Strategies or Measures
1.	Dragline Use	Restrict drop height to 5 metres
2.	Overburden Dumping by Truck	Limit to in-pit
3.	Batch drop conveyor	Partial cover of chute
4.	Wash Plant	Full Cover
5.	Loading Trains	Partial cover of chute
6.	Conveyor	Partial Cover
7.	Blasting	Restrict to daylight hours
8.	Drilling Overburden	Use bag filter
9.	Haul Road Use	Regular watering at 2 litres/m2/day Maintain average vehicle speed of 40 km/h
10.	Use of Disturbed areas	Progressive revegetation when practicable
11.	Coal Loading for Transport	Profile coal surface to flat "garden bed" shape. Wash product coal prior to transport to remove coal fines and other particles

B1-10 Where monitoring has shown, that the trigger level of 120 µg/m^3 for particulate matter (diameter <10 µm) (PM_{10}) averaged over 24 hours has been exceeded at a monitoring location, implement, as soon as is reasonably practicable, such of the strategies or measures for dust minimisation described in Schedule B Table 6 (or equivalent or better strategies or measures) which are likely to ensure the objective of 150 µg/m^3 is not exceeded at that monitoring location in relation to mining activities which are likely to contribute significantly to dust at the monitoring location.

Schedule B: Table 6: Additional strategies or measures

No.	Mining activity	Additional strategies or measures
1.	All mining activities	Implement a weather and dispersion forecasting system to identify adverse meteorological conditions and respond with the cessation or relocation of particular activities and/or the limitation of times during which particular activities may be undertaken while adverse conditions continue
2.	Use of active Stockpiles	Regular water spraying
3.	Truck dumping coal	Regular water spraying
4.	Use of disturbed areas	Planting of a wind break
5.	Use of Haul Roads	Application of chemical suppressants to roads generating impacts Alteration of routes to increase separation distances where practicable

B1-11 Undertake a reasonable and practicable monitoring program and provide a written report to the Administering Authority after a written notice from the Administering Authority requiring the undertaking of such a program and report where the Administering Authority has received a complaint which is neither frivolous or vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer) about the impacts of dust generated by the mining activities at a specific sensitive receptor.

B1-12 Where any monitoring undertaken in accordance with clauses (B1-4) and (B1-5) indicates that the air quality objective for particulate matter (diameter <10 µm) (PM_{10}) namely, 150 µg/m^3 averaged over 24 hours, has been exceeded, investigate and provide a written report to the Administering Authority as soon as is reasonably practicable assessing whether or not that exceedance was contributed to by an extreme weather circumstance.

B1-13 Not less than 3 months prior to the commencement of any mining activities in the Frank Creek Pit within the area described as the High Management Zone on the Mining Activity Plan, review the monitoring results required by clauses (B1-4) and (B1-5) for a period not less than 3 years, undertake further modelling of the impacts of dust generated in carrying out mining activities within the High Management Zone to determine if the requirements of clauses (B1-6) and (B1-7) will be met while mining activities are undertaken in the High Management Zone and provide a written report to the Administering Authority about such review and modelling.

B1-14 For the mining activity of power generation and discharges to the air environment, comply with the requirements and implement the strategies or measures described in Schedule B Table 7.

Schedule B: Table 7: Requirements, strategies and measures for power generation

No.	Requirement, Strategy or Measure
1.	Combustion Emissions will be directed through stacks not less than 21m high and 2.08 m effective diameter
2.	Exit velocity of stack emissions will not be less than 25.5 m/s
3.	Exit temperature of stack emissions will not be less than 375 degrees Celsius
4.	Emission volumes flow from each engine will not be less than 28 m^3 /s

27A.2.3 WATER

Summary of values and impacts

This section summarises the potential impacts of the mining activities on the water environment in and surrounding the MLA areas (which are described in detail in Chapter 10 Groundwater and Chapter 11 Water Supply and Management of the EIS and Supplementary EIS Volume 1). It also states the environmental protection commitments including objectives, standards, indicators and control strategies proposed by the WJV.

The Environmental Protection (Water) Policy 2009 (EPP (Water)) commenced on 28 August 2009 replacing the former Environmental Protection (Water) Policy 1997 which was in force when the EIS was published. The purpose of the EPP (Water) is to achieve the object of the EP Act in relation to Queensland waters, being the protection of Queensland's water environment while allowing for development that improves Queensland's total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. Against the framework of achieving that object, the EPP (Water) identifies the following environmental values of waters to be enhanced or protected:

- biological integrity of ecosystems (which varies depending on the categorisation of the waters as either high ecological value, as slightly disturbed, as moderately disturbed or as highly disturbed)
- for waters to be used in primary industry or agriculture, suitability for agricultural use, aquacultural use or producing aquatic foods for human consumption
- for waters to be used for recreation or aesthetic purposes, suitability for primary or secondary recreational use
- for waters to be used for drinking water, suitability for supply as drinking water
- for waters to be used for industrial purposes, suitability for industrial use.

No changes in the EPP (Water) from the policy previously in force are relevant to the assessment of the potential impacts of these mining activities on Queensland waters which are potentially affected by the Project.

The Project is located in the southern portion of the Fitzroy River drainage basin, in the upper catchment of the Dawson River. Approximately 83% of the Project MLA areas drain to Juandah Creek, with the remainder draining to Horse Creek. There is a mean annual flow from the Project area of around 9,000 ML/a, which makes up about 1.4% of the mean annual inflow to Glebe Weir on the Dawson River.

The EIS and Supplementary EIS have determined that waters potentially adversely affected by the Project's mining activities are:

- surface waters
- groundwater in shallow aquifers,and have also determined that water in the Great Artesian Basin is unlikely to be affected by the Project's mining activities. These reports considered the Project's potential impact on surface and groundwater quality, aquatic habitat, upstream and downstream flooding and of the drawdown of groundwater levels.

Surface waters

The following streams and declared watercourses cross the MLA areas:

Table 27A-9: Streams and declared watercourses

Stream	Flows to	Downstream discharge point	Watercourse (Y/N)	Catchment area (ha)	Length (km)
Duck Creek	Horse Creek	Y	N	2,200	10
Un-named Creek	Horse Creek	Y	N	2,300	23
Un-named Creek	Horse Creek	Y	N	2,270	23
Spring Creek	Horse Creek	Y	Y	6,730	67
Mount Organ Creek	Juandah Creek	N	Y	11,370	114
Mud Creek	Juandah Creek	Y	Y	17,530	175
Un-named Creek	Juandah Creek	Y	N	2,410	24
Un-named Creek	Juandah Creek	Y	N	1,040	10
Blackant Creek	Wandoan Creek	N	Y	3,740	37
Wandoan Creek	Woleebee Creek	N	Y	11,640	116
Woleebee Creek	Juandah Creek	Y	Y	75,330	753
One-Arm Man Creek	Woleebee Creek	N	Y	2,260	23
Halfway Creek	Frank Creek	N	N	2,290	23
Frank Creek	Juandah Creek	Y	Y	9,120	91
Two Mile Creek	Juandah Creek	Y	N	2,450	7

The EIS found surface waters of the area to be a 'slightly to moderately disturbed system' under ANZECC (2000), relating to the ephemeral nature of surface watercourses and agricultural nature of the region. Under the amended terminology in the EPP (Water) the Supplementary EIS has determined that the surface waters of the area are generally moderately disturbed.

Daily surface water quality monitoring undertaken for the Project and presented in the Supplementary EIS indicated the following surface water quality when compared to QWQG and ANZECC (2000) guidelines:

- exceedances of turbidity at Frank Creek (downstream), Woleebee Creek (downstream and upstream), Mud Creek (upstream), Juandah Creek (downstream and upstream), Spring Creek (upstream) and Mount Organ (upstream) monitoring sites
- exceedances of pH at Juandah Creek (downstream and upstream) and Woleebee Creek (downstream) monitoring sites
- exceedances of dissolved oxygen (DO) at Frank Creek (downstream), Woleebee Creek (downstream and upstream), Mud Creek (downstream and upstream), Juandah Creek (upstream), Spring Creek (upstream) and Mount Organ (downstream and upstream) monitoring sites
- exceedances of electrical conductivity (EC) at Juandah Creek (downstream).

The event water quality monitoring undertaken for the Supplementary EIS indicated the following water quality compared to QWQG and ANZECC (2000) guidelines for physical and chemical stressors and toxicants:

- exceedances of total suspended solids (TSS), turbidity, total nitrogen (TN), total phosphorus (TP) and iron at all sites
- exceedances of Chlorophyll a at Woleebee Creek (downstream) and Mud Creek (upstream)
- exceedances of chromium, copper, lead, nickel and zinc at Woleebee Creek (upstream)
- exceedances of chromium, copper, lead and zinc at Woleebee Creek (downstream), Juandah (downstream and upstream), Mud Creek (upstream), and Spring Creek (upstream)

- exceedances of chromium, copper, and zinc at Mud Creek (downstream)
- exceedances of copper and zinc at Frank Creek (downstream) and Mount Organ Creek (upstream).

The EIS and Supplementary EIS have identified the potential risks for off-site impacts on water quality, and appropriate receiving water concentrations conducive to the environmental values of the area. The ANZECC guidelines for 'slightly to moderately disturbed' 'upland' streams have been considered in conjunction with background monitoring data which indicates parameters that varied from the guidelines are pH, electrical conductivity, turbidity and dissolved oxygen.

The Supplementary EIS concluded that due to the intermittent nature of stream flow in the area and the availability of groundwater from the Great Artesian Basin aquifers, there is only limited use of surface waters in the immediate vicinity of the Project area.

Accordingly, surface water is unlikely to be used for purposes relating to the following values:

- aquacultural use or producing aquatic foods for human consumption
- recreation or aesthetic purposes
- supply as drinking water.

Further discussion of surface water quality is provided in Volume 1 Chapter 11 Water Supply and Management of the EIS and Supplementary EIS.

Flooding

The EIS and Supplementary EIS describe the system of stream diversions and flood levels proposed to prevent the ingress of flood waters to the mine pits in events up to the 0.1% AEP (1,000 year average recurrence interval (ARI) design flow event) and to ensure flows in major streams pass through the site and maintain downstream processes. Flood levels may also be locally affected by road, rail or conveyor crossings of water courses.

In modelling the potential impact of mining activities on flood levels, the EIS and Supplementary EIS assume that the relevant diversion works will be constructed in accordance with the Department of Natural Resources and Water's (now Department of the Environment and Resource Management) *Water Course Diversions – Central Queensland Mining* dated 14 January 2008 (Diversion Guideline).This modelling has concluded that there will be small, localised upstream flood level increases (which are considered not to require mitigation) from the stream diversions. For the relevant watercourse crossings, any flood level impacts will be within the MLA boundaries. This modelling also indicates that, for the unmitigated Woleebee Creek diversion design there would be, downstream of the site, increases in flood levels ranging up to 300 mm. The Supplementary EIS therefore proposes that in the detailed design of the Woleebee Creek diversion, some flood storage will be reintroduced to the diverted water courses in order to minimise, so far as is reasonably practicable, the increase in flood levels downstream to no greater than 100 mm.

Aquatic habitat

Potential impacts of the Project on aquatic habitat are described in Chapter 17B Aquatic Ecology of the EIS and Supplementary EIS. Potential impacts include:

- barriers to fish movement and impacts to the riparian environment due to the construction of creek crossings
- impacts on fish movement and impacts to the riparian environment due to the creation of stream diversions
- dam operation and storm water discharge changing flow regime.

While no significant adverse impacts are predicted, regular monitoring of aquatic habitat is proposed.

Groundwater quality

Groundwater investigations within and adjacent to the MLA areas indicate that there are no major aquifers associated with the shallow coal bearing units. The major GAB aquifers occur at significant depth (> 400 m) below the site and are separated from the proposed coal mining activities by thick aquitard units.

Minor groundwater resources were intersected within only one of the six original monitoring bores constructed for the EIS. A further 14 shallows bores were constructed within the alluvium, overburden, and shallow coal seams subsequent to the EIS. The drilling results indicated little or no groundwater strikes within these units across the entire proposed mine area.

Groundwater monitoring and field measurements indicate that the groundwater is saline and not readily utilised by local landowners.

As groundwater, within the alluvium, overburden, and the coal seams, is generally of poor quality and of low sustainable yield, the environmental value is assessed as “primary industry”, suitable for stock watering.

Groundwater does not discharge to or maintain water levels in any creeks in the study area and no groundwater dependent ecosystems have been identified. The alluvium associated with the creeks draining the site are, however, recognised to contain permeable sand and gravel, which during periods of creek flow recharge and act as storage to the non-perennial surface water resources. These aquifers may provide, via this limited effective storage, baseflow to the creek at the end of the wet season. The storage is recognised to be limited as the creeks are ephemeral. The alluvium is to be monitored to determine if mining activities will reduce the baseflow and impact on seasonal creek flows.

Tailings storage is proposed within the mined-out pit voids during the life of mine to a level below the natural ground surface. The storage of tailings slurry has the potential to impact on the shallow groundwater resources and may result in saline groundwater plumes, which could migrate offsite and into the surface water resources. Monitoring is proposed for these proposed tailings storage facilities due to the impact potential.

Groundwater drawdown

Based on a bore census, the interrogation of the DERM bore database, and the low yields and high salinity of the groundwater, it is recognised that there is a limited number of users extracting groundwater from the coal seam and overburden aquifers within close proximity to the proposed mine. Consequently, dewatering of coal seam aquifers during mining operations will not have any significant impact on the neighbouring groundwater users. The groundwater extraction from the Early Jurassic GAB aquifers below the site is hydraulically isolated from the younger Injune Creek Group strata (particularly the Juandah Coal Measures) and, therefore, impacts are not expected.

While the use of water from the GAB is proposed during the construction phase, it is expected that the quantity to be drawn will not impact substantially on the GAB. Nevertheless the WJV has considered a range of alternative construction water supply sources to be used in preference to the GAB, and there are good prospects of obtaining most, if not all construction raw water requirements from these sources (see Volume 1 Chapter 11 Water Supply and Management of the EIS and Supplementary EIS). GAB water would only be used during construction as a last resort.

The Supplementary EIS (Volume 1 Chapter 26 Cumulative Impacts) has identified that proposed coal seam methane (CSM) production projects in the vicinity of the Project could potentially result in induced groundwater flow, possibly from surrounding GAB aquifers, such as the Hutton Sandstone, due to the depressurisation of the deep coal measures. Therefore, the Project groundwater monitoring program will be increased (utilising existing available deep bores (600 to 1,200m)) to monitor groundwater level trends within the GAB aquifers to distinguish, if possible, between potential impacts from shallow surface mining under the Project, and potential impacts from the deeper CSM production projects.

Further discussion of groundwater is provided in Volume 1 Chapter 10 Groundwater and Chapter 11 Water Supply and Management of the EIS and Supplementary EIS.

Environmental protection commitments

In managing the surface and groundwater water impacts from all mining activities, the WJV provides the following commitments.

1. a) During flows in receiving surface waters, not cause the limits for the water quality indicators shown in Table 27A-10 to be exceeded at the monitoring sites shown on Schedule C Table 4 of the draft Environmental Authority (except in the circumstances described in clause 5).

   b) The percentile amounts (80th or 20th percentile) shown in Table 27A-10 shall be determined for each downstream monitoring site described in Schedule C Table 4 of the draft Environmental Authority using not less than 18 results taken over a four and a half (4.5) hour period at the related upstream monitoring site described in Schedule C Table 4 of the draft Environmental Authority from continuous real time monitoring stations. The percentile amounts shall be:

      i) determined prior to any release

      ii) updated at least daily while any release continues.

   c) The median or range for the relevant downstream monitoring point described in Schedule C Table 4 of the draft Environmental Authority shall be determined using not less than 18 results taken over a 4.5 hour period for the continuous real time monitoring stations and shall be updated daily while any release continues.

d) The limits to be met at each downstream monitoring site shall be determined from monitoring the water quality at the related upstream monitoring site (with the downstream monitoring sites and the related upstream monitoring sites being as described in Schedule C Table 4 of the draft Environmental Authority and as shown generally on the Mining Activities Plan).

Table 27A-10: Receiving water quality limits

Water quality indicator	Unit	Limits for water quality indicators at each downstream monitoring site	Limit type
pH (low) pH (high)	pH units	20th percentile1 or 6, whichever is lower; to 80th percentile1 , or 9, whichever is higher	Range
Electrical conductivity	uS/cm	80th percentile1, or 1000, whichever is higher	Median
Turbidity	NTU	80th percentile1 or 1000, whichever is higher	Median

Notes: 1. Limits based on the 80th or 20th percentile to be derived from ANZECC (2000) accepted methodology.

2. Releases of contaminants to surface waters shall only:
   a) Comprise those contaminants resulting from the operation of the mining activities.
   b) Be from the specified release points referred to in Condition (C1-2) of the draft Environmental Authority.
   c) Be to the specified off-site receiving waters referred to in Condition (C1-2) of the draft Environmental Authority.
   d) Only occur for the purposes of managing site water inventories and maintaining downstream flows, and:
      i) for all sediment dams – when receiving waters are flowing and for up to 10 days after flow ceases at the upstream of the monitoring point
      ii) for environmental dams – when receiving waters are flowing.
3. Undertake a baseline and operational monitoring program for surface water at the sites and for the periods described in Schedule C Table 4 of the draft Environmental Authority (or such alternative sites that result in equivalent or better monitoring data of the receiving water locations).
4. Monitoring will be undertaken for the contaminants shown in Schedule C Table 5 of the draft Environmental Authority.
5. In the circumstances described in Schedule C Table 3 of the draft Environmental Authority, the requirements of clause 1 not to cause the goals for the water quality indicators to be exceeded do not apply.
6. To undertake a baseline and operational monitoring program for groundwater within the shallow aquifers to commence on completion of the exploration drilling program at the locations, for the parameters and with the frequency described in Schedule C Table 6 of the draft Environmental Authority (or such alternative sites that result in equivalent or better monitoring data of the groundwater).
7. Groundwater monitoring will be undertaken in accordance with the following criteria:
   a) Groundwater monitoring to be undertaken in accordance with the latest edition of the Water Quality Sampling Manual, EPA.
   b) Laboratory analyses to be undertaken by a National Association of Testing Authorities (NATA) accredited laboratory.
   c) Results to be reviewed against the ANZECC 2000 Guidelines for stock watering.
8. Monitoring of the physical environment and ecological communities (comprising water quality, aquatic habitat, macrophytes and aquatic fauna) shall be undertaken seasonally as required with at least two baseline survey events prior to construction for the following parameters:
   - taxonomic richness
   - richness of pollution-sensitive invertebrate taxa (Plecoptera (stoneflies), Ephemoptera (mayflies), and Trichoptera (caddisflies) PET
   - DO
   - pH
   - temperature

- EC
- Turbidity.

9. Prepare, implement and maintain a Site Water Management Plan relevant components of which are included in successive plans of operations which addresses:
   a) Pit/process water management
   b) Overburden and disturbed area runoff water management
   c) Clean water management
   d) Water course diversion management

   which shall include reasonable and practicable strategies and measures to meet these commitments including some or all of the strategies or measures contained in the Control Strategies for Water listed in this EM Plan (or equivalent or better strategies or measures) and which shall include those strategies or measures shown Table 27A-11.

Table 27A-11: Site water management plan measures

No.	Measure
1.	Prior to construction of any water storage, sediment or environmental dam or levee undertake a risk assessment, in accordance with generally accepted standards to determine if: a) The water stored by the relevant dam or levee is a hazardous waste. b) The facility is a hazardous dam.
2.	All water storages, sediment or environmental dam or levees will be designed, constructed, operated and maintained in accordance with generally accepted engineering standards having regard to the risk assessment determination made in accordance with measure 1.
3.	All stream diversions will be designed, constructed, operated and maintained in accordance with generally accepted engineering standards and generally in accordance with the *Water Course Diversions – Central Queensland Mining* dated 14 January 2008 (or its equivalent).
4.	Prior to commencement of construction of any water storage, sediment or environmental dam or levee (which has been determined to be a hazardous dam), if applicable, a copy of the risk assessment determination referred to in measure 1 and the design plans and specifications prepared in accordance with measure 2 will be submitted to the Administering Authority.
5.	Prior to commencement of construction of any stream diversion , a copy of the design plans and specifications prepared in accordance with measure 3 will be submitted to the Administering Authority.
6.	As soon as reasonably practicable after completion of construction of any water storage, sediment or environmental dam or levee or stream diversion (which has been determined to be a hazardous dam), a copy of as constructed plans will be provided to the Administering Authority.
7.	For each water storage, sediment or environmental dam or levee which has been determined to be a hazardous dam, an annual inspection reviewing the condition of the dam against the design and as constructed plans shall be undertaken in accordance with generally accepted engineering standards and: a) A written report about that inspection shall be provided to the administering authority. b) Any recommended actions or maintenance to ensure that the dam is in accordance with the design and construction plans and specifications shall be undertaken as soon as is reasonably practicable.
8.	Water quality in any water storage, sediment or environmental dam or levee will be periodically sampled and analysed to ensure that only water appropriate for each dam or levee, having regard to the risk assessment determination referred to in Measure 1, are stored in each dam or levee.
9.	For each water storage, sediment or environmental dam or levee which has been determined to be a hazardous dam, a monitoring program will be implemented for groundwater and land contamination.
10.	The pit/process water component of the Site Water Management System will be designed and operated having regard to these principles: • to capture and store rainwater, groundwater seepage and surface water runoff in environmental dams to facilitate the reuse of captured water for mining activities • environmental dams will have sufficient storage to ensure the annual risk of discharge is no greater than 1% AEP based on historical climate conditions • environmental dams will have a spillway capacity of 1% AEP • to minimize the catchment area for the pit/process water system • to achieve the beneficial reuse of water as far as practicable in mine operations • to include a water pipeline beside the conveyor between the CPP and dump stations in the MLA areas to

No.	Measure
	facilitate the reuse of pit/process water • to provide for the storage of excess water from environmental dams in pits during wet periods.
11.	The overburden and disturbed land runoff component of the Site Water Management System will be designed and operated having regard to these principles: • runoff from overburden stockpiles and other disturbed areas will be directed to sediment dams to remove suspended sediment • sediment dams will be designed to provide sufficient on-site storage to settle coarse suspended solids during significant rainfall events, and will be operated as "dry basins" temporarily containing runoff from the 10% Annual Exceedance Probability (AEP) time of concentration rainfall events • sediment dams will have a spillway capacity of 1% AEP • sediment dams will incorporate outlet works sized to ensure the sediment dams may be emptied within 10 days of filling • sediment dams outlet works will include provision for a control valve to be fitted to store or release water ▪ runoff from rehabilitated overburden and disturbed land will be diverted away from the Site Water Management System when its water quality is suitable for offsite discharge without treatment.

10. The components of the Site Water Management System, including but not limited to water storage dams, sediment dams, environmental dams, levees and stream diversions and other works will be generally in accordance with the locations shown on the Mining Activities Plan.
11. Revegetation of riparian areas of diverted watercourses will be undertaken in accordance with the Land Rehabilitation section of this EM Plan.

Control strategies

The following Table 27A-12 contains examples of operational control strategies, additional to those in Table 27A-11 which may be incorporated in the Site Water Management System where appropriate.

Table 27A-12: Control strategies or measures

No.	Strategy or measure
1.	Site Water Management System
	General control strategies relevant to the site water management system (location of environmental dams, sediment dams and clean water dams) include the following: • use of contaminant source studies from the EIS and Supplementary EIS • saline drainage prevention and management measures • acid rock drainage monitoring and management measures, if relevant • emergency and contingency planning • monitoring and review program • components of the system will be laid out where possible, to minimise the areas of undisturbed catchment captured in dams and pits • measures for the beneficial reuse of water as far as practicable in mine operations and to reduce total raw water off-take (from either CSM water or the Glebe Weir) • minimise the demand for raw water supply, by recirculation and recycling of process water throughout the CPP • use of processed water in preference to raw water for dust suppression where water quality permits • fuel and chemical storages facilities to meet AS 1940:2004 Storage and Handling of Flammable and Combustible Liquids (or equivalent), and appropriately bunded and dewatered through oil water separators to reduce the risk of contamination of surface and groundwater caused by an escape of fuels or chemicals • for temporary and permanent drainage, and erosion and sediment control avoid where possible, disturbance to natural watercourses and riparian areas and reinstate any disturbed areas • identify soil and water management issues, including site conditions, topography, soil and climate data, erosion prone areas, and location of the nearest and other relevant environmentally sensitive areas • minimise disturbance, provide temporary and permanent drainage measures as early as possible, and identification of suitable erosion and sediment control for the site • divert upslope water to reduce on-site erosion by limiting catchment size.

No.	Strategy or measure
2.	CSM Raw Water Storage and Treatment
	If coal seam methane water is adopted as the raw water supply source (to be supplied to the Project at up to 4,000 mg/L total dissolved solids (TDS)), example control strategies include: • install clay-lining the dam if suitable materials can be obtained locally or use of a polyethylene liner • install monitoring bores to detect any leakage • if required, construct and operate a reverse osmosis treatment facility to treat approximately 450 kL/day (equivalent to 165 ML/annum) near the CPP to treat a small amount of CSM water for general wash purposes around the MIA and CPP • if a reverse osmosis treatment facility is constructed, assess the volume and quality of reject water to ensure that the reject water can be disposed of in the tailings storage facilities, or provide an alternative disposal method.
3.	CSM Water for Dust Suppression
	The following are examples of control strategies to be applied where appropriate (or equivalent or better) to limit the potential for impacts from the use of CSM water for dust suppression, if CSM water is selected as the operational water supply option: • using water captured in the site water management system in preference to CSM water when it is available • providing small catch drains to intercept runoff from haul road table drains during low flows to limit the extent of salt discharge during small rain fall events • commissioning of a further experimental program if the haul road material differs to the material already considered to assess the potential for precipitated salts to be dissolved and mobilised by rainfall, in relation to rainfall intensity, and modify future management of salt on haul roads • conducting periodic monitoring of salinity and SAR during the operation of a haul road, including the road drains and adjacent land. Where high levels of salinity or SAR are observed, implement additional management measures • bury or remove pit ramps as a component of decommissioning and rehabilitation • conducting measurements of soil salinity and SAR prior to the decommissioning of a haul road, including the road surface, drains, sediment ponds and adjacent land. Where required, material with high salinity or SAR will be excavated appropriately disposed of or otherwise remediated, during haul road rehabilitation.
4.	Aquatic Habitat
	The following are examples of control strategies which may be adopted where appropriate for preserving aquatic habitat: • where feasible, use box culverts at major creek crossings to minimise impacts to aquatic fauna passage • design creek diversions to ensure that natural geomorphological processes can be maintained • in stream rehabilitation and design/construction of diversion channels to provide a stable sinuous low-flow channel with dimensions similar to the existing natural channel such that similar flow conditions are maintained • prepare vegetation and rehabilitation plns for the creek diversions, detailing the in-stream and stream bank rehabilitation measures to create a self-sustaining system. This plan will include provision for the diversion to be designed and constructed to provide bed, bank and in-stream habitat of a similar character to that of natural watercourses within the region • open diversions to flows once geotechnical stability and vegetation requirements have been satisfactorily established. Until this time, maintain the existing channels to continue to function normally • capture fish (and other aquatic fauna) from the creek to be diverted using gear appropriate to the waterways and species present (this is likely to include electrofishing, cast nets, seine nets and set traps) • regularly survey on-site dams for the presence of exotic fish species • size channels to avoid design velocities in excess of 1m/s as far as practicable • where possible, design diversion channels so that natural in-stream flow velocities are not exceeded.
5.	Groundwater
	The following are examples of control strategies which may be applied where appropriate for groundwater: • where there is a risk of contamination from artificial recharge from water storage, use appropriate low permeable linings • the risk of potential contamination of aquifers due to infiltration from fuel or chemical spills will be addressed by the design of appropriate storage, bunding and the development and implementation of spill response

No.	Strategy or measure
	procedures • contain mine water (including dewatering) on site limiting artificial recharge where possible.
6.	Stream Diversions
	In undertaking and designing watercourse diversions, consider the following principles: • local geomorphological characteristics of the watercourses in the design of watercourse diversions • monitoring the water quality for each creek diversion • the channel capacity will be equivalent or similar to the capacity of the channel existing in the vicinity • the length of the channel will be nearly equivalent or similar to the length of the channel it replaces • the channel will exhibit features similar to the natural existing watercourse such as meanders, terraces and benches • the capacity of the floodplain to deal with out-of-channel flows • potential impacts on the adjoining reaches of the watercourse • develop rehabilitation and revegetation plans of each creek diversion • relevant upper limits for the hydraulic characteristics of the channel.

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule C – Water

C1-1 This authority authorises the release to the environment (water) of the contaminants generated in carrying out the mining activities only in accordance with the conditions of this Schedule C.

C1-2 The contaminants that may be released are those resulting from the operation of the mining activities and at the release point locations listed in Schedule C Table 1.

Schedule C: Table 1: Release points and off-site receiving waters/monitoring sites

Release point location	Activity	Release point or area*	Off-site receiving waters	Monitoring sites[1]
AU-E1	Environmental Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
AU-E2	Environmental Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
AU-E4	Environmental Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
AU-S1	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7/7(a)
AU-S2	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7/7(a)
AU-S3	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1/1(a) Upstream 2/3/4
AU-S4	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
AU-S6	Sediment Dam	Spillway or outlet works	Juandah Creek	Downstream 5 Upstream 7/7(a)
AU-S7	Sediment Dam	Spillway or outlet works	Juandah Creek	Downstream 5 Upstream 7/7(a)
AUN-S1	Sediment Dam	Spillway or outlet works	Juandah Creek	Downstream 5 Upstream 6/6(a)/7/7(a)
AUN-S2	Sediment Dam	Spillway or outlet works	Juandah Creek	Downstream 5 Upstream 6/6(a)/7/7(a)

Release point location	Activity	Release point or area*	Off-site receiving waters	Monitoring sites[1]
AUN-S4	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
FC-E1	Environmental Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
FC-S1	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
FC-S2	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
FC-S3	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7/7(a)
FC-S4	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7/7(a)
FCW-S1	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
L-S1	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
L-S2	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
L-S3	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
MC-E2	Environmental Dam	Spillway or outlet works	Mud Creek	Downstream 8/8(a) Upstream 9/10
MC-S1	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8/8(a) Upstream 9/10
MC-S2	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
MC-S3	Sediment Dam	Spillway or outlet works	Mud Creek	Upstream 9 Downstream 10
MC-S4	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8/8(a) Upstream 9/10
MC-S5	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
MCN-S1	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8 Upstream 9/10
SH-E3	Environmental Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
SH-S1	Sediment Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
SH-S2	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8 Upstream 9/10
SH-S3	Sediment Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
SH-S4	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8 Upstream 9/10
SH-S5	Sediment Dam	Spillway or outlet works	Mud Creek	Downstream 8 Upstream 9

Release point location	Activity	Release point or area*	Off-site receiving waters	Monitoring sites[1]
SH-S6	Sediment Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
TH-S2	Sediment Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
TH-S3	Sediment Dam	Spillway or outlet works	Duck Creek	Downstream 12 Upstream 9
TH-S4	Sediment Dam	Spillway or outlet works	Spring Creek	Downstream 11(a) Upstream 9
WC-S1	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2
W-E2	Environmental Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S1	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S2	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
W-S3	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
W-S4	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S5	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
W-S6	Sediment Dam	Spillway or outlet works	Frank Creek	Downstream 5 Upstream 7(a)
W-S7	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S8	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S9	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S10	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
W-S11	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
WN-S1	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
WN-S2	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
WN-S3	Sediment Dam	Spillway or outlet works	Woleebee Creek	Downstream 1 Upstream 2/3/4
WU-S1	Sediment Dam	Spillway or outlet works	Two Mile Creek	Downstream 5 Upstream 6(a)
WU-S2	Sediment Dam	Spillway or outlet works	Juandah Creek	Downstream 5 Upstream 6(a)
AU-R1-1	Raw Water Storage Dam	Spillway	Woleebee Creek	Downstream 1 Upstream 2/3/4

* As described in Schedule C Table 4 and shown generally on the Mining Activities Plan.

C1-3 Such contaminants may only be released from the points or areas and to the Offsite Receiving waters described in Schedule C Table 1, and only occur for the purposes of managing site water inventories and maintaining downstream flows and:

a) For all sediment dams, when receiving waters are flowing and for up to 10 days after flow ceases upstream of the release point.

b) For all environmental dams, when receiving waters are flowing.

C1-4 a) During flows in receiving surface waters, the release of contaminants must not cause the limits for the water quality indicators described in Schedule C Table 2 to be exceeded at the monitoring sites described in Schedule C Table 4 (except in the circumstances described in condition C1-5).

b) The percentile amounts (80^{th} or 20^{th} percentile) shown in Schedule C Table 2 shall be determined for each downstream monitoring site described in Schedule C Table 4 using not less than 18 results taken over a four and a half (4.5) hour period at the related upstream monitoring site described in Schedule C Table 4 from the continuous real time monitoring station installed in accordance with condition (C1-7). The percentile amounts shall be:

i) determined prior to any release

ii) updated at least daily while any release continues.

c) The median or range for the relevant downstream monitoring point described in Schedule C Table 4 shall be determined using not less than 18 results taken over a 4.5 hour period for the continuous real time monitoring station installed in accordance with condition (C1-7) and shall be updated daily while any release continues.

d) The limits to be met at each downstream monitoring site shall be determined from monitoring the water quality at the related upstream monitoring site (with the downstream monitoring sites and the related upstream monitoring sites being as described in Schedule C Table 4 of the draft Environmental Authority and as shown generally on the Mining Activities Plan).

Schedule C: Table 2 Receiving water quality limits

Water quality indicator	Unit	Limits for water quality indicators at each downstream monitoring site	Limit type
pH (low) pH (high)	pH units	20th percentile1 or 6, whichever is lower; to 80th percentile1 , or 9, whichever is higher	Range
Electrical conductivity	uS/cm	80th percentile1, or 1000, whichever is higher	Median
Turbidity	NTU	80th percentile1 or 1000, whichever is higher	Median

Notes: 1. Limits based on the 80^{th} or 20^{th} percentile to be derived from ANZECC (2000) accepted methodology.

C1-5 In the circumstances described in Schedule C Table 3 the release of contaminants need not comply with Schedule C Tables 2.

Schedule C: Table 3: Circumstances where releases need not comply with Schedule C Table 2

No.	Circumstances
1.	Spillway releases during rainfall events within the catchment of each relevant dam which exceed the design capacity of the dam
2.	Where water quality limits in Schedule C Table 2 are being exceeded at upstream monitoring locations and/or downstream locations which are not currently directly impacted by mining operations

C1-6 a) Monitoring of the receiving environment (water), shall be conducted for surface water at each monitoring site and for timeframes described in Schedule C Table 4 and as shown generally on the Mining Activities Plan (or such alternative sites that result in equivalent or better monitoring data of the receiving water).

b) For each monitoring site to be superseded by an alternative site, monitoring shall continue at the former site until the commencement of monitoring at the substituted site.

Schedule C: Table 4: Receiving water quality monitoring sites and timeframes

No.	Downstream monitoring site	Related upstream monitoring sites	Timeframes
7.	W-DW Downstream Woleebee Creek (DS Woleebee Creek) Easting (Approx) 788907 Northing (Approx) 7116742		To commence one year prior to commencement of mine construction
7(a).	Woleebee Creek Downstream Easting (Approx) 788199 Northing (Approx) 7116168		Already installed monitoring site. (Will be superseded by W-DW (Downstream Woleebee Creek)
4.		AltW-UW Upper Woleebee Creek (Alternative US Woleebee Creek) Easting (Approx) 783585 Northing (Approx) 7102081	To commence one year prior to construction of the creek diversion in Woleebee Creek and/or one year prior to operations commencing at Woleebee Creek Pit
5		AltW-UWa Wandoan Creek (Alternative US Wandoan Creek) Easting (Approx) 781114 Northing (Approx) 7101390	To commence one year prior to construction of Wandoan and Woleebee Creek diversion and/or one year prior to operations commencing at Woleebee Creek Pit
6.		W-UW Upper Woleebee Creek (US Woleebee Creek) Easting (Approx) 785187 Northing (Approx) 7104135	Already installed monitoring site
3.	J-DJ Downstream Juandah Creek (DS Juandah Creek) Easting (Approx) 790733 Northing (Approx) 7114761		Already installed monitoring site
1.		J-UJ Upper Juandah Creek (US Upper Juandah Creek) Easting (Approx) 797875 Northing (Approx) 7106452	Already installed monitoring site (Will be superseded by the new Upper Juandah Creek (1(a)))
1(a).		Upstream Juandah Creek Easting (Approx) 799058 Northing (Approx) 7105181	To commence no later than one year prior to operations commencing in Wubagul Pit
2.		J-UF Upper Frank Creek Dam (US Frank Creek Dam) Easting (Approx) 792990 Northing (Approx) 7105336	Already installed monitoring site (Will be superseded by Upstream Frank Creek (2(a))
2(a).		Upstream Frank Creek Easting (Approx) 790733 Northing (Approx) 7114761	To commence no later than one year prior to operations commencing in Frank Creek Pit
10.	M-DMu Downstream Mud Creek (DS Mud Creek) Easting (Approx) 783948 Northing (Approx) 7122555		To commence one year prior to operations commencing in Mud Creek Pit
10(a)	Mud Creek Downstream Easting (Approx) 780685 Northing (Approx) 7120837		Already installed monitoring site (to be superseded by Downstream Mud Creek (10))

No.	Downstream monitoring site	Related upstream monitoring sites	Timeframes
8.		M-UM Upper Mount Organ Creek Easting (Approx) 773829 Northing (Approx) 7111479	Already installed monitoring site
9.		M-UMu Upper Mud Creek Easting (Approx) 776940 Northing (Approx) 7109591	Already installed monitoring site
11.	Spring Creek Downstream Easting (Approx) 772325 Northing (Approx) 7120213		Already installed monitoring site To cease once infrastructure associated with mining of Summer Hill and Turkey Hill Pits commences construction Will be superseded by S-DS Downstream Spring Creek (12)
11(a)	S-DS Downstream Spring Creek (DS Spring Creek) Easting (Approx) 771710 Northing (Approx) 7125959		To commence one year prior to operations commencing at Summer Hill and Turkey Hill Pits
12.	D-DS Duck Creek Easting (Approx) 767160 Northing (Approx) 7125353		To commence one year prior to operations commencing at Turkey Hill Pit
8.		M-UM Upper Mount Organ Creek Easting (Approx) 773829 Northing (Approx) 7111479	Already installed monitoring site

C1-7 Monitoring will be undertaken for the contaminants shown in Schedule C Table 5 in accordance with the EPA Water Quality Sampling Manual 1999 (or equivalent):

a) For contaminants 1 to 5 shall be real time, continuous sampling.

b) For contaminants 6 to 30 shall be daily during major flow events.

Schedule C: Table 5: Monitoring of contaminants

No.	Contaminant	Unit
1	pH	pH units
2	Electrical conductivity	uS/cm
3	Turbidity	NTU
4	Dissolved oxygen	mg/L
5	Temperature	Degrees C
6	TSS	mg/L
7	TN	mg/L
8	TP	mg/L
9	BOD	mg/L
10	Chlorophyll a	mg/L
11	Aluminium	mg/L
12	Arsenic	mg/L
13	Cadmium	mg/L
14	Copper	mg/L
15	Chromium	mg/L

No.	Contaminant	Unit
16	Lead	mg/L
17	Nickel	mg/L
18	Zinc	mg/L
19	Mercury	mg/L
20	Iron	mg/L
21	Manganese	mg/L
22	Selenium	mg/L
23	Chlorobenzene	µg/L
24	1,2 dichlorobenzene	µg/L
25	1,4-dichlorobenzene	µg/L
26	Ethylbenzene	µg/L
27	Benzo-(a)-pyrene	µg/L
28	Toluene	µg/L
29	OC and OP pesticides	µg/L
30	Sulphate	mg/L

C1-8 Monitoring of groundwater shall be conducted for the parameters, at the sites (or such alternative sites that result in equivalent or better monitoring data of the groundwater) and with the frequencies described in Schedule C Table 6.

Schedule C: Table 6: Groundwater monitoring program

Monitoring Sites*	Parameter	Frequency	Comment
WMB1-D, WMB1-S, WMB2, WMB3-D, WMB3-S G8011D, G8012D, G8013D, G8018D	Water level	Every 12 hours – electronic loggers	Assess drawdown in shallow coal seam aquifer, assess possible changes in groundwater quality
	pH, EC, TDS (lab), cations, anions, selected metals	3 months	
G8010S, G8011S, G8012S, G8013S, G8016S, G8017S	Water level	Every 12 hours – electronic loggers	Determine baseline hydrochemistry and groundwater level variation in alluvium aquifer (minimum 12 months)
	pH, EC, TDS (lab), cations, anions, selected metals	3 months	

Note: * As shown generally on the Mining Activities Plan. The bores will be drilled to ~ 60 m and will be scientifically sited based on the evaluation of exploration drilling conducted within the area. The bores positions will consider the mine plan so as to ensure longevity of these monitoring points.

C1-9 The following information will be recorded about release events:

- release commencement time/date
- expected release cessation time/date
- release point/s
- release volume (estimated)
- receiving water/s including the natural flow rate.

C1-10 Monitoring of the physical environment and ecological communities (comprising water quality, aquatic habitat, macrophytes and aquatic fauna) shall be undertaken seasonally as required with at least two baseline survey events prior to construction, of the following parameters:

- taxonomic richness
- richness of pollution-sensitive invertebrate taxa (Plecoptera (stoneflies), Ephemoptera (mayflies), and Trichoptera (caddisflies) PET
- DO

- pH
- temperature
- EC
- turbidity

C1-11 Prepare, implement and maintain a Site Water Management Plan relevant components of which are included in successive plans of operations which addresses:

a) Pit/process water management.

b) Overburden and disturbed area runoff water management.

c) Clean water management.

d) Water course diversion management.

which shall include reasonable and practicable strategies and measures to meet these conditions including some or all of the strategies or measures contained in the Control Strategies for Water listed in the EM Plan on which these conditions were based (or equivalent or better strategies or measures) but which shall include those strategies or measures shown Schedule C Table 7.

Schedule C: Table 7: Site water management plan measures

No.	Measure
1.	Prior to construction of any water storage, sediment or environmental dam or levee undertake a risk assessment, in accordance with generally accepted standards to determine if: a) the water stored by the relevant dam or levee is a hazardous waste b) the facility is a hazardous dam.
2.	All water storages, sediment or environmental dam or levees will be designed, constructed, operated and maintained in accordance with generally accepted engineering standards having regard to the risk assessment determination made in accordance with measure 1.
3.	All stream diversions will be designed, constructed, operated and maintained in accordance with generally accepted engineering standards and generally in accordance with the *Water Course Diversions – Central Queensland Mining* dated 14 January 2008 (or its equivalent).
4.	Prior to commencement of construction of any water storage, sediment or environmental dam or levee (which has been determined to be a hazardous dam), if applicable, a copy of the risk assessment determination referred to in measure 1 and the design plans and specifications prepared in accordance with measure 2 will be submitted to the Administering Authority.
5.	Prior to commencement of construction of any stream diversion, a copy of the design plans and specifications prepared in accordance with measure 3 will be submitted to the Administering Authority.
6.	As soon as reasonably practicable after completion of construction of any water storage, sediment or environmental dam or levee or stream diversion (which has been determined to be a hazardous dam), a copy of as constructed plans will be provided to the Administering Authority.
7.	For each water storage, sediment or environmental dam or levee which has been determined to be a hazardous dam, an annual inspection reviewing the condition of the dam against the design and as constructed plans shall be undertaken in accordance with generally accepted engineering standards and: • a written report about that inspection shall be provided to the administering authority • any recommended actions or maintenance to ensure that the dam is in accordance with the design and construction plans and specifications shall be undertaken as soon as is reasonably practicable.
8.	Water quality in any water storage, sediment or environmental dam or levee will be periodically sampled and analysed to ensure that only water appropriate for each dam or levee, having regard to the risk assessment determination referred to in Measure 1, are stored in each dam or levee.
9.	For each water storage, sediment or environmental dam or levee which has been determined to be a hazardous dam, a monitoring program will be implemented for groundwater and land contamination.
10.	The pit/process water component of the Site Water Management System will be designed and operated having regard to these principles: • to capture and store rainwater, groundwater seepage and surface water runoff in environmental dams to facilitate the reuse of captured water for mining activities • environmental dams will have sufficient storage to ensure the annual risk of discharge is no greater than 1% AEP based on historical climate conditions • environmental dams will have a spillway capacity of 1% AEP • to minimize the catchment area for the pit/process water system

No.	Measure
	• to achieve the beneficial reuse of water as far as practicable in mine operations • to include a water pipeline beside the conveyor between the CPP and dump stations in the MLA areas to facilitate the reuse of pit/process water • to provide for the storage of excess water from environmental dams in pits during wet periods.
11.	The overburden and disturbed land runoff component of the Site Water Management System will be designed and operated having regard to these principles: • runoff from overburden stockpiles and other disturbed areas will be directed to sediment dams to remove suspended sediment • sediment dams will be designed to provide sufficient on-site storage to settle coarse suspended solids during significant rainfall events, and will be operated as "dry basins" temporarily containing runoff from the 10% Annual Exceedance Probability (AEP) time of concentration rainfall events • sediment dams will have a spillway capacity of 1% AEP • sediment dams will incorporate outlet works sized to ensure the sediment dams may be emptied within 10 days of filling • sediment dams outlet works will include provision for a control valve to be fitted to store or release water • runoff from rehabilitated overburden and disturbed land will be diverted away from the Site Water Management System when its water quality is suitable for offsite discharge without treatment.

C1-12 The components of the Site Water Management System, including but not limited to water storage dams, sediment dams, environmental dams, levees and stream diversions and other works will be generally in accordance with the locations shown on the Mining Activities Plan.

C1-13 The clearing of vegetation in the course of implementing the Site Water Management System including all stream diversions is authorised by this Environmental Authority.

27A.2.4 NOISE AND VIBRATION

SUMMARY OF VALUES AND IMPACTS (NOISE)

This section summarises the potential impacts of the mining activities on the environmental values of the existing acoustic environment (which are described in detail in Chapters 15 of the EIS and Supplementary EIS). It also states the environmental protection commitments including objectives, standards, indicators and control strategies proposed by the Proponent.

Since publication of the EIS, the Environmental Protection (Noise) Policy 2008 (EPP (Noise)) came into effect on 1 January 2009, and the Supplementary EIS addressed the application of the EPP (Noise) to the Project.

The purpose of the EPP (Noise) is to achieve the object of the EP Act in relation to the acoustic environment, being the protection of Queensland's acoustic environment while allowing for development that improves Queensland's total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends. Against the framework of achieving that object, the EPP (Noise) identifies the following environmental values of the acoustic environment to be enhanced or protected:

- health and biodiversity of ecosystems
- human health and wellbeing (including the ability to sleep, study or learn and be involved in recreation including relaxation and conversation)
- community amenity.

The EIS and the Supplementary EIS have determined that environmental nuisance may be contributed to by noise generated in carrying out the mining activities. Table 27A-13 summarises background noise logging results.

Table 27A-13: Summary of background noise logging results (average rating background level (RBL) dBA)

Time	N1 Nathan Road	N2 Wodonga	N3 Town
Day	26 dBA	25 dBA	26 dBA
Evening	30 dBA	35 dBA	27 dBA
Night	18 dBA	19 dBA	24 dBA

However, after modelling of example mine planning scenarios over the life of the Project and using the assumptions explained for each scenario, these reports have concluded that while the Project's mining activities are being undertaken, none of the acoustic quality objectives in Schedule 1 of the EPP (Noise) will be exceeded at any sensitive receptors (with the exception of the cemetery) under worst case meteorological conditions (except where neutral weather conditions are noted). Tables 27A 14 and 27A-15 summarise the data which supports these conclusions.

Table 27A-14: Predicted noise levels (EIS Scenarios) with attenuated equipment+ and under worst case meteorological conditions*

Receptor	Predicted noise Leq (1 hour) (dBA)				
	Scenario 2 Year 1+	Scenario 3c/d Year 5	Scenario 4 Year 10	Scenario 5 Year 20	Scenario 6 Year 30
Cemetery	40	40/27*	40	40	40
MLA-378	30	30/20*	28	30	28
MLA-601	23	24	22	23	22
MLA-520	25	33/28*	23	28	23
MLA-706	25	34/29*	22	26	22
MLA-616	24	33/28*	22	25	22
MLA-718	26	34/29*	22	25	22
Town Centre	23	28/23*	21	24	22
MLA-240	23	32/27*	22	24	22
MLA-478	21	29/24*	19	22	19
MLA-434	20	27	18	21	18
MLA-640	<15	20	<15	<15	<15
MLA-579	<15	16	<15	<15	<15
MLA-557	<15	15	<15	<15	<15
MLA-591	<15	15	<15	<15	<15
MLA-484	<15	20	16	<15	19
MLA-679	<15	15	<15	<15	19
MLA-659	<15	<15	<15	<15	19
MLA-505	<15	25	24	16	32
MLA-552	21	24	22	22	29
MLA-300	16	19	18	19	23
MLA-453	<15	<15	15	20	25
MLA-305	<15	<15	18	22	22
MLA-459	<15	<15	20	24	19
MLA-404	<15	<15	20	21	18
MLA-49	<15	<15	19	19	<15
MLA-50	<15	<15	23	24	17
MLA-595	<15	<15	35	22	23
MLA-728	<15	<15	27	<15	<15
MLA-720	<15	<15	28	22	20
MLA-692	<15	<15	21	21	23
MLA-712	<15	<15	21	20	26
MLA-697	<15	<15	20	18	25
MLA-693	<15	<15	20	19	26
MLA-175	<15	<15	17	17	22
MLA-199	<15	<15	<15	17	19
MLA-244	23	23	22	23	23
MLA-277	27	27	26	27	26

Notes: + - Scenario 2 predicted noise levels using an attenuated dragline bucket.

* - Predicted noise levels for Scenario 3c/d under neutral weather conditions. Neutral weather conditions are assumed to be no downwind propagation and no occurrence of a temperature inversion during the assessment period of one hour.

Table 27A-15: Predicted noise levels (Supplementary EIS scenarios) under worst case meteorological conditions

Receptor	Predicted noise Leq (1 hour) (dBA)				
	Scenario 2 Year 1++	Scenario 3 Year 5**	Scenario 4 Year 10**	Scenario 5 Year 20++	Scenario 6 Year 30**
Cemetery	40	40	39	42	39
MLA-134	<15	<15	17	21	<15
MLA-168	<15	<15	19	20	23
MLA-175	<15	<15	22	23	26
MLA-188	<15	<15	17	21	23
MLA-199	<15	<15	17	22	22
MLA-239	23	23	23	27	28
MLA-240	24	34	27	29	29
MLA-244	23	23	23	25	24
MLA-277	27	27	27	28	27
MLA-300	19	22	22	25	29
MLA-305	<15	<15	23	29	28
MLA-310	26	26	25	26	26
MLA-318	27	27	26	27	26
MLA-355	23	23	24	28	33
MLA-356	31	32	30	31	30
MLA-364	30	31	29	33	29
MLA-378	31	32	29	33	29
MLA-397	28	28	27	28	27
MLA-404	<15	<15	24	27	23
MLA-415	<15	<15	<15	17	18
MLA-420	<15	<15	<15	19	21
MLA-434	22	37	25	26	30
MLA-443	<15	<15	<15	21	23
MLA-453	<15	<15	19	25	31
MLA-478	22	35	26	28	29
MLA-484	<15	24	21	15	22
MLA-49	<15	<15	23	25	17
MLA-494	<15	28	<15	<15	26
MLA-50	<15	<15	28	30	21
MLA-505	18	29	30	22	27
MLA-520	27	31	27	34	27
MLA-531	18	27	31	22	32
MLA-556	<15	25	<15	19	19
MLA-574	<15	25	<15	20	20
MLA-576	<15	25	15	20	20

Receptor	Predicted noise Leq (1 hour) (dBA)				
	Scenario 2 Year 1++	Scenario 3 Year 5**	Scenario 4 Year 10**	Scenario 5 Year 20++	Scenario 6 Year 30**
MLA-579	<15	32	<15	<15	28
MLA-595	<15	<15	35	29	16
MLA-601	24	25	23	26	23
MLA-616	25	32	28	31	28
MLA-640	<15	35	18	19	29
MLA-679	<15	16	18	<15	18
MLA-687	<15	<15	25	23	30
MLA-692	<15	<15	27	28	29
MLA-693	<15	<15	26	25	32
MLA-695	<15	<15	25	25	27
MLA-706	26	32	28	31	28
MLA-718	27	33	27	30	28
MLA-720	<15	<15	31	28	26
MLA-742	<15	<15	24	27	29
Grosmont School	<15	<15	20	22	24
Town Centre	24	31	27	29	28

Notes: ++ Using attenuated equipment

** Using unattenuated equipment

Not causing, when taken with background noise levels, the acoustic quality objectives from the EPP (Noise) to be exceeded at any sensitive receptor (with the exception of the cemetery) has been adopted as the Project's acoustic criteria. In addition, as under the EPP (Noise) no acoustic quality objective has been set for outdoor levels at a dwelling during the night time, a further Project acoustic criteria is proposed. Based on the EPP (Noise) objective for night time dwelling (indoors) and also taking into account existing background levels and other recognised objectives for industrial type activities in rural areas, the EIS and Supplementary EIS have nominated as a night time dwelling outdoor objective, $L_{eq1\ hour}$ 35 dBA which should not be exceeded at any sensitive receptor by the combination of existing background noise levels and noise generated from mining activities.

The EIS and Supplementary EIS have identified that mitigating noise impacts is best achieved by a combination of a monitoring program, management activities in response after a nominated trigger level is reached (as shown by the monitoring program), and the use of lower noise and noise attenuated machinery in areas likely to produce the greatest risk of noise impacts. The management measures shown in Table 27A-23 are examples of control strategies which represent current best practice measures to be applied in managing the impacts of noise generated in undertaking the Project. It is expected that equivalent or better additional strategies will be developed over the life of the Project.

This combined proposal of monitoring, attenuation and management measures represent the application of the management hierarchy for noise emissions from the Project, namely avoid, minimise and manage to best practice environmental management.

The WJV will prepare, implement and update a Noise Management Plan based on these recommendations with the relevant requirements of the Noise Management Plan being incorporated in Plans of Operations from time to time.

SUMMARY OF VALUES AND IMPACTS (VIBRATION)

The EIS and Supplementary EIS have identified that the main source of vibration generated from mining activities will be from blasting. Other potential sources of vibration include coal trains and coal handling and preparation plant (CHPP) operations and infrequent periods of heavy lifts. Potential impacts from fly rock have also been identified.

Based on the modelling undertaken, the reports have concluded that:

- while some modelling (which did not allow for mitigation) indicated that levels of impact allowed under the EP Act may be exceeded on a small number of occasions, levels of impact within the allowable limits should be able to be achieved, at places outside the MLA areas and the accommodation village, by monitoring and the implementation of appropriate management measures if monitoring indicates that the allowable limits may be exceeded
- the likelihood of problems from fly rock can be minimized by suitable management measures
- Blasting

The Environmental Protection Regulation 1998, which included blasting criteria as discussed in the EIS Volume 1, Chapter 16, section 16.2.1, has been replaced by the new Environmental Protection Regulation 2008, which does not contain blasting criteria. Blasting criteria from the Environmental Protection Regulation 1998 are now covered under section 440ZB of the EP Act. The EP Act criteria are less stringent than the EPA *Guideline: Noise and vibration from blasting* (EPA 2006) (the Blasting Guideline) referred to in the EIS, and therefore the blasting criteria used in the EIS are still relevant to this assessment.

The EIS estimated, in accordance with the Blasting Guideline, for a range of blast designs, ground vibration and airblast overpressure impacts by determining the distance at which there is a 90% probability that a blast will generate a Peak Particle Velocity (PPV) of 5 mm/s or less (ground vibration) and no more than 115 dB (linear) (airblast overpressure).

Table 27A-16 summarises inputs to the estimation of ground vibration for a range of Wandoan blast designs from the EIS.

Table 27A-16: Inputs to estimation of ground vibration for Wandoan blast designs (EIS)

Bench height (m)	charge per hole (kg)	Holes per delay	Distance to 5 mm/s (m)
3	10	6	231
5	26	6	372
7.5	61	5	448
10	95	5	540
15	295	4	754
20	422	4	861
30	1,011	4	1,131
40	1,455	4	1,357
50	1,809	4	1,513

Table 27A-17 summarises inputs to the estimation of airblast overpressure for a range of Wandoan blast designs from the EIS.

Table 27A-17: Summary of airblast overpressure calculations (EIS)

Bench height (m)	charge per hole (kg)	Holes per delay	Distance to 115 dBl (m)	Distance to 120 dBl (m)
3	10	6	423	284
5	26	6	582	391
7.5	61	5	727	489
10	95	5	843	567
15	295	4	1,142	768

Bench height (m)	charge per hole (kg)	Holes per delay	Distance to 115 dBl (m)	Distance to 120 dBl (m)
20	422	4	1,287	865
30	1,011	4	1,722	1,157
40	1,455	4	1,944	1,307
50	1,809	4	2,090	1,405

Comparing Tables 27A-16 and 27A-17, the distance to the recommended airblast overpressure is greater than the distance to the recommended ground vibration limit. This means that if the airblast overpressure criteria are satisfied, then the ground vibration criteria will also be met.

Unmitigated impacts from blasting are predicted (on the scenarios considered in the EIS and Supplementary EIS) to exceed the recommended Blasting Guideline limits for airblast overpressure at a number of sites. Table 27A-18 identifies eight such sensitive receptor sites lying outside the Project's MLA areas for the EIS blast designs.

Table 27A-18: Sensitive receptors potentially affected by the Project blasting operations (EIS)

Receptor number	Receptor type	Distance to closest blasting (m)
MLA-374 and MLA-367	A house and shed complex	Approximately 1,000m north of the Austinvale North Pit
MLA-595 and MLA-596	A house and shed complex	Approximately 900 m south west of the Turkey Hill Pit
MLA-355	A house	1,500 m south of the Mud Creek Pit
MLA-361	A house	2,000 m south of the Mud Creek Pit
MLA-309, MLA-298, MLA-301 and MLA-303	A house and 3 shed complex	1,500 m west of the Woleebee Creek Pit
MLA-552 and MLA-551	A house and shed complex	1,900 m south west of the Woleebee Creek Pit
MLA-531, MLA-541, MLA-548 and MLA-554	Four sheds (feedlot)	900 m south west of the Woleebee South Pit
MLA-505 and MLA-578	A house and shed complex	500 m south east of the Woleebee South Pit

Under the blast designs considered in the Supplementary EIS (which take into account refinements/ modifications to the Project and its scheduling), changes to the sensitive receptors likely to be impacted by blasting have occurred. Table 27A-19 identifies these receptors.

Table 27A-19: Sensitive receptors potentially impacted by Project blasting operations (Supplementary EIS)

Receptor number	Receptor type	Distance to closest Project Blasting Area (m)
MLA-374 and MLA-367	A house and shed complex	Approx 1,000 m north of the Austinvale North Pit
MLA-520	A house	Approx 1700 m east of the Frank Creek Pit
MLA-595 and MLA-596	A house and shed complex	Approx 900 m south west of the Turkey Hill Pit
MLA-355 (current)	A house	Approx 1,500 m south of the Mud Creek Pit
MLA-361	A house	Approx 2000 m south of the Mud Creek Pit
MLA-309, MLA-298, MLA-301 and MLA-303	A house and three shed complex	Approx 1,500 m west of the Woleebee Creek Pit
MLA-552 and MLA-551	A house and shed complex	Approx 1,900 m south west of the Woleebee Creek Pit

Under the Supplementary EIS's blast designs, the Wandoan township, the Telstra communication tower and the feed lot will not be impacted by blasting. The abattoir, identified in the EIS as potentially affected, has been acquired by the WJV. No changes are predicted for impacts at the Cemetery.

Analyses in the Supplementary EIS indicate that blasting operations in the north western end of the Austinvale North Pit may result in ground vibration levels up to 8 mm/s at the nearest boundary of the accommodation facilities. Airblast levels up to 124 dBl may also be experienced. These levels drop to 4.6 mm/s and 120 dBl in the centre of the accommodation facilities area. It should be noted that these figures represent the 90th percentile of the range of vibration and airblast levels likely to be experienced, with the majority of blasts expected to generate lower values.

The levels predicted for the southern boundary of the accommodation facilities exceed the Blasting Guideline limits of 5 mm/s and 115 dBl respectively, but are well below the levels required to cause physical damage. The blast effects may be noticed as a mild vibration from either the ground vibration directly or the airblast interacting with accommodation facility structures.

The blast locations where environmental impacts at the accommodation facilities may exceed the guideline limits are shown on Figure 16-4-SV1.3. The area (which, when blasted produces these impacts) will be mined very early in the Project life. Operations in this area should be completed in a matter of months and involve a small number of individual blasts. The impact of these blasts can be reduced by:

- informing personnel in the area about blasting time
- scheduling blasts for times when people are not sleeping or resting, but engaged in routine activities, for instance, 8:00 am or 4:00 pm.

The potential impact on farm, community or other groundwater bores was discussed in Volume 1, Chapter 16, section 16.5.2 of the EIS. Section 16.5.2 of the EIS indicates that existing bores are not particularly vulnerable to damage from nearby blasting. The EP Act criteria are based on nuisance to persons and not damage to structures or services. Damage to structures occurs at higher vibration levels than nuisance to persons. Studies have found that physical damage to common structures, including groundwater bores, is highly unlikely for blast vibration levels below 50 mm/s. This is 10 times the EP Act limit for 4 out of 5 blasts. An extensive literature survey found no evidence of groundwater bores being damaged by mine blasts, including bores in close proximity to blasting.

Blasting is regularly conducted on mine sites within close proximity to water storage dams, and as such water storage dams outside the MLA areas and outside the blasting exclusion zone are highly unlikely to be damaged from blasting activities.

Coal trains accessing and exiting the Project site along the spur line from the proposed Surat Basin Rail line may produce intermittent ground vibration impacts. The proposed spur line route is close to Sensitive Receptors MLA-374 and MLA-367 (a house and shed complex).

Fly rock

As stated in section 16.6.2 of the EIS, an exclusion zone of 600m from blast locations is recommended within which all persons should be excluded while blasting occurs.

Parts of the accommodation facilities and other site infrastructure will fall within the exclusion zone required to protect personnel from the effects of fly rock for some blasts early in the Project. Procedures will be developed to evacuate these areas during blasting operations.

The current mine plan includes dragline strips in the northern half of the Frank Creek Pit approaching within 600 m of the Leichhardt Highway. The eastern boundary of the Wubagul Pit is 500 m from the Leichhardt Highway. This means that the fly rock exclusion zone required for blasts in the box cut and the first mining strip, at a distance between 500 m and 600 m from the highway, will extend beyond the highway.

Suitable mitigation measures to manage the impacts from fly rock from blasting in this area are:

- redefine the eastern boundary of these pits to be 600 m from the highway; or
- free-dig the material within 600 m of the highway so that blasts are not required; or
- establish a procedure for temporarily closing the highway in consultation with the Department of Transport and Main Roads (formerly the Department of Main Roads) and Western Downs Regional Council, while the exclusion zone for blasts extends beyond the highway.

The relevant chapters of the EIS and the Supplementary EIS are Volume 1 Chapter 16 Vibration.

Environmental Protection Commitments

Noise

In managing the releases of noise from all mining activities WJV provides the following commitments.

1. Prepare, implement and update a Noise Management Plan for the respective phases of the Project. The Plan will include, as appropriate, reasonable and practicable measures to achieve compliance with the commitments taken from the control strategies (or such equivalent or better measures) listed on Table 27A-23.
2. Undertake a monitoring program at the locations described in Table 27A-20 which have been determined to be locations which are representative of sensitive receptors likely to be impacted by the generation of noise from mining activities within the Receiving Areas shown on the Receiving Areas Plan also described in Table 27A-20.

Table 27A-20: Noise monitoring locations

No.	Location	Representative area on receiving area plan	Duration	Type
1.	MLA-378	Leichhardt	During the operation of the Project.	Fixed automated monitoring (existing, continuous monitoring)
2.	N3	Town (Central)	During the operation of the Project.	Fixed automated monitoring (existing, continuous monitoring)
3.	MLA-520	Town (North)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
4.	MLA-640	Town (South)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
5.	MLA-720	Mudcreek (West)	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
6.	MLA-595	Turkey Hill	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
7.	MLA-305	Woleebee West (West)	Monthly once mining of the northern 50% of Summer Hill Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
8.	MLA-693	Mudcreek (Central)	Monthly during operation of Summer Hill North Pit.	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
9.	MLA-355	Woleebee West (Central)	Monthly once mining of the northern 50% of Mud Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
10.	MLA-300	Woleebee West (East)	Monthly once mining of the northern 50% of Woleebee Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period

3. The monitoring program will be established at the representative sites (or equivalent or better) prior to the commencement of mining activities likely to impact on the Receiving Area of which that site is representative and will continue until the mining activities likely to impact at that area have ceased.
4. If monitoring cannot be continued at a particular location for any reason (for example a refusal or withdrawal of consent by the owner) the program will be continued as soon as is reasonably practicable at an alternative location representative of the relevant Receiving Area.
5. Monitoring at each location will comprise a sound level meter meeting Type 1 or Type 2 specification as outlined in AS 1259 1990 *Acoustics – Sound Level Meters* following the measurement procedure outlined in EPA (Qld) *Noise Measurement Manual*, Third Edition 1 March 2000 or AS 1055-1997 *Acoustics – Description and Measurement of Environmental Noise*.
6. In carrying out the mining activities not generate noise to the extent which, with background noise levels, causes the acoustic quality objectives described in Table 27A-21 to be exceeded at any sensitive receptor outside the ML areas (other than the cemetery and those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants).

Table 27A-21: Acoustic quality objectives

Source	Sensitive receptor	Time of day	Acoustic quality objective at receptor (dBA)		
			LAeq, 1hr	LA10, 1hr	LA1, 1hr
EPP (Noise)	Dwelling (outdoors)	Daytime and evening	50	55	65
EPP (Noise)	Dwelling (indoors)	Daytime and evening	35	40	45
Project	Dwelling (outdoors)	Night time	35		
EPP (Noise)	Library and educational institution (indoors)	When open for business or when classes being offered	35	—	—
EPP (Noise)	School playground (outdoors)	When the children usually sleep	55	—	—
EPP (Noise)	Hospital surgery or other medical institution (indoors)	Visiting hours	35	—	—
EPP (Noise)		Anytime outside visiting hours	30	—	—
EPP (Noise)	Commercial and retail activity (indoors)	When the activity is open for business	45	—	—

7. Undertake attenuation of mining equipment used in the mining activities where necessary in the Wubagul, Frank Creek and Turkey Hill Pits to achieve the acoustic quality objectives described in clause 6, so that the required mining equipment sound power levels in Table 27A-22 are achieved.

Table 27A-22: Mining equipment sound power limits following attenuation

Mining equipment	Sound power level (dBA)
Dragline:	
body	107
bucket	116
Dozer	114
Dump truck	110
Excavator (medium and small)	111
Front end loader	111
Grader	110
Overburden drill	112
Water truck	112

8. Where monitoring has shown that the trigger level of 35 dBA has been exceeded at a monitoring point, implement as soon as reasonably practicable, such strategies or measures for noise minimisation described in the Noise Management Plan (or equivalent or better measures or strategies), or review the measures in the Noise Management Plan, if necessary, to incorporate such further strategies or measures as may be required to achieve the noise objectives.

9. Undertake a reasonable and practicable monitoring program and provide a written report to the administering authority after a written notice, require the undertaking of such a program and report where the administering authority has received a complaint which is neither frivolous or vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer) about the impacts of noise generated by the mining activities at a specific sensitive receptor.
10. Not less than 3 months prior to the commencement of any mining activities in the Frank Creek Pit within the area described as the High Management Zone on the Mining Activity Plan, review the monitoring results required by clause 5 for a period not less than 3 years, undertake further modelling of the impacts of noise generated in carrying out mining activities within the High Management Zone to determine if the requirements of clause 6 will be met while mining activities are undertaken in the High Management Zone and provide a written report to the Administering Authority about such review and modelling.

Vibration

In managing the mining activity of blasting WJV provides the following commitments.

1. Prepare, implement and update a Blast Management Plan to address all blasting activities of the Project which will include reasonable and practicable measures to achieve compliance with these commitments which measures may be taken from the control strategies (or equivalent or better control strategies) listed in Table 27A-24.
2. The airblast overpressure from any blast will not exceed 120 db (linear peak) at any sensitive receptor outside both the MLA areas and the accommodation village.
3. The airblast overpressure for 4 out of any 5 blasts will not exceed 115 db (linear peak) at any sensitive receptor outside both the MLA areas and the accommodation village.
4. Undertake a monitoring program for airblast overpressure at sites determined to be representative of any group of sensitive receptors likely to be impacted by the mining activity of blasting.
5. Each monitoring program will be established at the representative sites upon commencement of blasting activities likely to have an impact on the area for which that site is representative, and will continue until the blasting activities have ceased.
6. Monitoring at each representative site will include the following descriptors, characteristics and conditions, and will be in accordance with the Blasting Guideline:
   a) Location of the blast within the MLA areas (including bench levels).
   b) Atmospheric conditions including temperature, relative humidity, wind speed and direction.
   c) Location date and time of blast.
7. Where the monitoring program has shown that the airblast overpressure level of 115 db (linear Peak) for 4 out of 5 blasts is likely to be exceeded at a monitoring site, undertake a review of all relevant aspects of the Blast Management Plan and, as soon as is reasonably practicable, either:
   a) Implement additional strategies or measures from the Blast Management Plan (or equivalent or better strategies or measures); or
   b) Modify the strategies or measures in the Blast Management Plan and implement the modified strategies or measures.
8. Undertake a reasonable and practicable monitoring program and provide a written report on the monitoring program to the administering authority upon receiving a written request from the administering authority, where the administering authority has received a complaint which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer) about the impacts of blasting from the mining activities at a specific sensitive receptor.
9. Include in the Blast Management Plan, strategies or measures for minimisation of any potential impacts from fly rock.
10. Prior to the commencement of blasting activities, undertake condition surveys of buildings and structures which may be impacted by blasting activities where the consent of the relevant land owner has been given.

Control strategies

Noise

The following are examples of control strategies which aim to achieve the noise commitments:

Table 27A-23: Control strategies

No.	Measure
1.	During construction activities: stationary equipment contributing to noise (such as air compressors and generators) so far as is practicable, away from noise sensitive locations as part of the ongoing community consultation program prior notice of proposed construction activities will be given to the community complaints regarding noise will be dealt with in accordance with the Project's complaints procedure.
2.	In relation to the attenuation of mining equipment: noise specifications to meet the required sound power limits will be included in tender documentation verification measurements for equipment and attenuation will be undertaken to verify the relevant sound power limits relevant mining equipment and attenuation components will be regularly maintained; a register of all mining equipment likely to contribute significantly to noise will be prepared and maintained.
3.	Broadband reversing sirens will be installed on all vehicles.
4.	At the power station: exhaust silences will be installed on each engine to provide a minimum insertion loss of 20dB the tender specification for noise will require that the engine haul not exceed 85dBA at 1m and that the overall complex will not exceed 65dBA at its boundary fence a minimum of 20m from the radiator cooling towers regulator monitoring of noise emitted from the power station will be undertaken to verify that these limits are met.
5.	Accommodation facilities: Location and design of facilities will be ensure that internal noise levels as outlined in AS 2107 Acoustics – Recommended design sound levels and reverberation times for building interiors" are met
6.	In response to adverse meteorological conditions, reviewing mining activities being undertaken and consideration of management actions to meet commitment 6, which may include: investigation of additional attenuation for the mining equipment limiting mining activities to particular locations or particular times while adverse meteorological conditions continue restricting the use of drag line operations.

Vibration

Table 27A-24 contains examples of operational control strategies which may be applied where appropriate to achieve the vibration commitments.

Table 27A-24: Control strategies

Number	Control Strategy
1.	General Notification procedures for all blasting events, including signage at the mine site, Leichhardt Highway and township. The Blast Management Plan will consider: timing of blasts – restricted to daylight hours bench height size/number of blasts restricting, avoiding or modifying blasts in adverse weather conditions.
2.	Blast Monitoring Program A suitably qualified person will routinely monitor and report on the performance of blasting operations. The locations and techniques selected for routine monitoring will comply with the requirements of AS 2187 (or equivalent). The data will be used to develop local predictive models of these impacts so that blast designs can be tuned to minimise their impacts and improve production performance. The monitoring program, data analysis, reporting and modelling will form part of the Blast Management Plan.

Number	Control Strategy
3.	Complaints management A site hot line will be established for residents who wish to report air quality, noise or blasting related incidents associated with the operation of the Project. Complaints will be managed in accordance with conditions of the Environmental Authority.
4.	The Cemetery Advance notification will be provided to the cemetery manager for proposed blasting activities. Condition surveys of the cemetery structures will be undertaken prior to mining of the Leichhardt Pit, and three monthly during mining in the vicinity of the cemetery to monitor any changes that might be identified.
5.	Mine infrastructure Potential impacts and inconveniences from blasting to mine infrastructure and services within the MLA areas will be managed through the mine's operating protocols.
6.	Accommodation facilities During blasting in Austinvale North, personnel in the area will be informed about blasting times During blasting in Austinvale North, blasts will scheduled for times when people are not sleeping or resting, but engaged on routine activities; for instance, 8 am or 4 pm might be suitable times for blasts.
7.	Fly Rock Exclusion Zone A Fly Rock Exclusion Zone around a blasting site of 600m will generally be adopted. Where parts of the accommodation facility or mine infrastructure likely to be occupied by persons will be within the 600m Fly Rock Exclusion Zone, procedures will be implemented for the evacuation of the relevant area during blasting. The Parts of the northern section of Frank Creek Pit and Wubagul Pit are located within 600 m of the Leichhardt Highway. Suitable mitigation measures will be implemented to ensure safety of the general public in relation to fly rock, for example: redefine the eastern boundary of these pits to be 600 m from the highway free-dig the material within 600 m of the highway so that blasts are not required; or establish a procedure for temporarily closing the highway in consultation with the Department of Transport and Main Roads (formerly the Department of Main Roads) and Western Downs Regional Council, while the exclusion zone for blasts extends beyond the highway.

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule D - Noise and vibration

Noise

D1-1 Prepare, implement and update a Noise Management Plan for the respective phases of the Project which will include reasonable and practicable measures to achieve compliance with clause (D1-5).

D1-2 This authority authorises the generate of noise generated in carrying out the mining activities only in accordance with the conditions of this Schedule D.

D1-3 Monitoring of the receiving acoustic environment shall be conducted (subject to obtaining consent from the relevant owner) at the representative location described in Schedule D Table 1 which locations are representative of the potentially impacted Receiving Areas shown on the Receiving Areas Plan also shown in Schedule D Table 1 and for the duration shown in Schedule D Table 1. If monitoring cannot be continued at a particular location for any reason (for example a refusal or withdrawal of consent by the owner) the program will be continued as soon as is reasonably practicable at an alternative location representative of the relevant Receiving Area.

Schedule D: Table 1: Representative locations for receiving areas

No.	Location	Representative area on receiving area plan	Duration	Type
1.	MLA-378	Leichhardt	During the operation of the Project.	Fixed automated, continuous monitoring
2.	N3	Town (Central)	During the operation of the Project.	Fixed automated, continuous monitoring
3.	MLA-520	Town (North)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
4.	MLA-640	Town (South)	One month before commencement of mining at Wubagul Pit and at monthly intervals during the operation of the Frank Creek and Wubagul Pits	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
5.	MLA-720	Mudcreek (West)	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
6.	MLA-595	Turkey Hill	Monthly during the operation of Turkey Hill Pit	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
7.	MLA-305	Woleebee West (West)	Monthly once mining of the northern 50% of Summer Hill Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
8.	MLA-693	Mudcreek (Central)	Monthly during operation of Summer Hill North Pit.	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
9.	MLA-355	Woleebee West (Central)	Monthly once mining of the northern 50% of Mud Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period
10.	MLA-300	Woleebee West (East)	Monthly once mining of the northern 50% of Woleebee Creek Pit is completed	Mobile or fixed automated continuous monitoring using an unattended noise logger for a defined (minimum seven day) period

D1-4 Monitoring under clause (D1-3) shall be of the type and in accordance with the standards described in Schedule D Table 2.

Schedule D: Table 2: Monitoring Indicators and Standards

Monitor type	Standard	Location
Continuous	Recorded at 15 minute intervals for the following monitoring parameters: $L_{A90, 1hr}$ $L_{Aeq, 1hr}$ $L_{A10, 1hr}$ $L_{A1, 1hr}$	All monitoring locations
Spot measurements	Hand held validation tool to validate noise logger results	As required

D1-5 Noise generated In carrying out the mining activities will not cause, with background noise levels, the acoustic quality objectives in Schedule 1 of the EPP (Noise) and the further objectives all of which are described in Schedule D Table 3 to be exceeded at any sensitive receptor outside the ML areas (other than those for which a consent not to meet those objectives has been provided to the holder on behalf of the occupants).

Schedule D: Table 3: Acoustic quality objectives

Source	Sensitive receptor	Time of day	Acoustic quality objective at receptor (dBA)		
			LAeq, 1hr	LA10, 1hr	LA1, 1hr
EPP (Noise)	Dwelling (outdoors)	Daytime and evening	50	55	65
EPP (Noise)	Dwelling (indoors)	Daytime and evening	35	40	45
Project	Dwelling (outdoors)	Night time	35		
EPP (Noise)	Library and educational institution (indoors)	When open for business or when classes being offered	35	—	—
EPP (Noise)	School playground (outdoors)	When the children usually sleep	55	—	—
EPP (Noise)	Hospital surgery or other medical institution (indoors)	Visiting hours	35	—	—
EPP (Noise)		Anytime outside visiting hours	30	—	—
EPP (Noise)	Commercial and retail activity (indoors)	When the activity is open for business	45	—	—

D1-6 The holder will not be in breach of clause (D1-5) for any sensitive receptor where the monitoring undertaken pursuant to clauses (D1-3), for the Representative location relevant to the Receiving Area indicates compliance with clause (D1-5) for that location.

D1-7 Implement attenuation of mining equipment used in the mining activities carried out in the Wubagul, Frank Creek and Turkey Hill Pits for noise minimisation to achieve, for the nominated equipment, the sound power levels in Schedule D Table 4.

Schedule D: Table 4: Mining equipment sound power limits following attenuation

Mining Equipment	Sound power level (dBA)
Dragline body bucket	 107 116
Dozer	114
Dump truck	110
Excavator (medium and small)	111
Front end loader	111
Grader	110
Overburden drill	112
Water truck	112

D1-8 Where monitoring has shown that the trigger level of 35 dBA has been exceeded at a monitoring location, implement as soon as reasonably practicable, such strategies or measures for noise minimisation described in the Noise Management Plan (or equivalent or better measures or strategies), or review the measures in the Noise Management Plan, if necessary, to incorporate such further strategies or measures as may be required to achieve the noise objectives.

D1-9 Undertake a reasonable and practicable monitoring program and provide a written report to the administering authority after a written notice from the administering authority requiring the undertaking of such a program and report where the administering authority has received a complaint which is neither frivolous or vexatious nor based on mistaken belief (in the reasonable

opinion of an authorised officer) about the impacts of noise generated by the mining activities at a specific sensitive receptor.

D1-10 Not less than 3 months prior to the commencement of any mining activities in the Frank Creek Pit within the area described as the High Management Zone on the Mining Activity Plan, review the monitoring results required by clause (D1-3) for a period not less than 3 years, undertake further modelling of the impacts of noise generated in carrying out mining activities within the High Management Zone to determine if the requirements of clause (D1-5) will be met while mining activities are undertaken in the High Management Zone and provide a written report to the Administering Authority about such review and modelling (on request).

Blast vibration and airblast overpressure

D1-11 This Environmental Authority authorises the release of blast vibration and airblast overpressure generated in carrying out the mining activities only in accordance with the conditions of this Schedule D.

D1-12 The airblast overpressure from any blast will not exceed 120dB (linear peak) at any sensitive receptor outside both the MLA areas and the accommodation village.

D1-13 The airblast overpressure for 4 out of any 5 blasts will not exceed 115dB (linear peak) at any sensitive receptor outside both the MLA areas and the accommodation village.

D1-14 Prepare, implement and update a Blast Management Plan to address all blasting activities and which will include reasonable and practicable measures to achieve compliance with conditions (D1-11) and (D1-12) of this Schedule D and the minimisation of any potential impacts from fly rock.

D1-15 Undertake a monitoring program for airblast overpressure to be established at representative sites upon commencement of blasting activities likely to have an impact on the area for which that site is representative, and continue until the blasting activities have ceased. The monitoring program will include the following descriptors, characteristics and conditions and be in accordance with the Blasting Guideline (or equivalent):

a) Location of the blast within the MLA areas (Including bench levels).

b) Atmospheric conditions including temperature, relative humidity, wind speed and direction.

c) Location date and time of recording.

D1-16 Where the monitoring program has shown that the airblast overpressure level of 115dB (linear peak) for 4 out of 5 blasts is likely to be exceeded at a monitoring site, undertake a review of all relevant aspects of the Blast Management Plan and implement, as soon as is reasonably practicable, either:

a) Additional strategies or measures from the Blast Management Plan; or

b) Modify the strategy or measures in the Blast Management Plan including blast procedures and operational controls such as the timing of blasts, bench height, the size and number of blasts and avoiding or modifying blasts in adverse weather conditions.

D1-17 Undertake a reasonable and practicable monitoring program and provide a written report on the monitoring program results to the administering authority upon receiving a written request from the administering authority, where the administering authority has received a complaint which is neither frivolous nor vexatious nor based on mistaken belief (in the reasonable opinion of an authorised officer) about the impacts of blasting from the mining activities at a specific sensitive receptor.

D1-18 Prior to the commencement of blasting activities, undertake conditions surveys of buildings and structures which may be impacted by blasting activities where the consent of the relevant land owner has been given.

27A.2.5 WASTE (OTHER THAN MINERAL WASTE)

SUMMARY OF VALUES AND IMPACTS

This section of the EM Plan covers waste other than Mineral Wastes.

The EIS and Supplementary EIS have identified the range and quantities of wastes generated in carrying out the mining activities and described which wastes will be disposed of on the MLA areas and those which will be transported for off-site disposal. These reports have also recognized that improper storage or disposal of waste may impact the environmental values recognized in the Environmental Protection (Waste Management) Policy 2000, namely:

- the life, health and well-being of people

- the diversity of ecological processes and associated ecosystems
- the land use capability.

The principal objective of the waste management strategy for the Project is to minimise the impacts on land resources, water quality and air quality, and to manage waste in a manner that avoids any direct or indirect impacts on the environment or health of people working at the mine and the community.

Waste minimisation has been considered throughout the initial planning and conceptual design stages of the Project and will continue during detailed design, construction and operations. The waste management hierarchy:

- waste avoidance
- waste re-use
- waste recycling
- energy recovery from waste
- waste disposal

has been considered when selecting the waste management strategies for each waste stream.

Waste sources

The major sources of waste generated from the mining activities and the proposed management strategies are described in Table 27A-27.

Waste quantities

The Supplementary EIS Volume 1, Chapter 18 Waste Management, section 18.5.2 identifies the types and quantities of waste generated during the site preparation and construction phases. An estimate of the quantity of waste generated on site for the 28 month construction period is presented in Table 27A-25 below.

These quantities provide a conservative estimate of waste quantities during the construction phase of the Project. The segregation and on-site reuse of building waste, earthen fill and green waste materials is expected to reduce overall waste quantities.

Offsite prefabrication of some concrete and metallic structures is expected to further reduce wastage rates.

Table 27A-25: Waste Inventory Estimates for Construction Period

Waste material	Waste sources	Basis of calculation	Units	Quantity
Green waste	Clearing of vegetation during early works and construction phase of mine	Total vegetation to be cleared, including remnant and regrowth vegetation = 196.3 ha (refer Supplementary EIS Volume 1), Chapter 17A Terrestrial Ecology, Table 17A-2, infrastructure on MLA areas and gas supply pipeline) Biomass per hectare = 180 tonnes, including above and below ground (Westman & Rogers 1977).	tonnes	35,500
Cardboard and paper	Construction activities, contractor crib rooms, offices, accommodation facilities	Includes construction paper and cardboard. Assume 10-15% mass equivalent of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	6,200
Plastics	Contractor crib rooms, offices, accommodation facilities, construction activities	Assume 5% mass equivalent of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	2,100
Glass	Contractor crib rooms, offices, accommodation facilities, construction activities	Assume 2% mass equivalent of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	1,400

Waste material	Waste sources	Basis of calculation	Units	Quantity
Metals	Construction of conveyor, power lines and structures of the mine infrastructure area and accommodation facilities	Assume 5-10% mass equivalent of total onsite construction metal materials (based on self-assessed wastage rates for building services, EPA 2002) and 10-15% of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	5,500
Processed timber and wood	Left-over from new construction, and demolition of existing structures and temporary construction phase structures	Assume 15-20% mass equivalent of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	6,900
Concrete materials, bricks and pavers	Left-over from new construction and demolition of temporary construction phase structures	Assume 0.5% mass equivalent of total onsite construction concrete materials (based on self-assessed wastage rates for concrete trades, EPA 2002) and 20-25% of total construction waste stream (based on composition of residential and construction waste (EPA 2002) and adjusted for the Project).	tonnes	11,000
Electrical wastes	Contractor crib rooms, offices, accommodation facilities	Assume 2% mass equivalent of total construction waste.	tonnes	1,200
General and putrescible wastes	Contractor crib rooms, offices, accommodation facilities	Data sourced from XCQ's operating coal mines and scaled for the Project based on size of the construction workforce plus 25% to allow for potential inefficiencies in recyclable waste segregation.	tonnes	5,900
Batteries	Mobile phones, radios, vehicles, equipment, etc	Data sourced from XCQ's operating coal mines and scaled for the Project based on the size of the construction workforce.	tonnes	190
Oils (synthetic and mineral)	Routine servicing of vehicles and equipment at designated hardstand areas near the construction office facilities. Construction and assembly of the draglines and other mining equipment.	Data sourced from XCQ's operating coal mines and scaled for the Project based on size of the construction workforce.	tonnes	5,100
Other hydrocarbon and hydrocarbon contaminated materials	Routine servicing of vehicles and equipment at designated hardstand areas near the construction office facilities. Construction and assembly of the draglines and other mining equipment.	Data sourced from XCQ's operating coal mines and scaled for the Project based on size of the construction workforce. Assumed to include regulated waste.	tonnes	5,200
Empty waste oil containers	Small and bulk drums and containers that typically contained oils and greases.			

Waste material	Waste sources	Basis of calculation	Units	Quantity
Sealers, resins, solvents and paint materials	Construction of the MIA, accommodation facilities and conveyors, and assembly and maintenance of vehicles and equipment. Construction and assembly of the draglines and other mining equipment.			
Other regulated waste	Demolition, maintenance and construction activities.			
Asbestos	Demolished existing structures	Presence of existing materials to be identified by audit and investigation in advance of upgrade or demolition works.	tonnes	-
Discharge from vehicle washdown	Construction vehicle washdown facilities near construction offices	Assume construction vehicle fleet comprises 40 heavy vehicles and 150 light vehicles requiring washdown once every three weeks. Assume discharge from washdown: Heavy vehicle = 200 litres; Light vehicle = 70 litres.	kilolitres	730
Tyres	Maintenance of vehicles	Assume construction vehicle fleet comprises 40 heavy vehicles requiring annual tyre change.	Number	550
		Assume construction vehicle fleet comprises 150 light vehicles requiring tyre change once every two years.	Number	700
Sewage effluent	Contractor offices, crib room, accommodation facilities	Assume 28 months construction using projected wastewater generation by Project construction personnel.	kilolitres	235,500
Wastewater treatment plant sludge	Wandoan Wastewater Treatment Plant	Volumetric fraction of solids in the sewage effluent for the upgraded Wandoan WWTP Assuming 28 month of construction using projected sludge generation by Project construction personnel.	tonnes	56

The Supplementary EIS Volume 1, Chapter 18 Waste Management, section 18.5.3 identifies the types of waste generated during the operational phase. The indicative quantities of operational waste are presented in Table 27A-26 below.

Table 27A-26: Operations waste inventory estimates

Waste material	Waste sources	Basis of calculation	Units	Quantity
Green waste	Clearing of vegetation for ongoing development of the mine	Total cleared vegetation, including remnant and regrowth vegetation, less construction phase clearance = 593 ha (refer Supplementary EIS Volume 1, Chapter 17A Terrestrial Ecology, Table 17A-2, mining pits). Biomass per hectare = 180 tonnes, including above and below ground (Westman & Rogers 1977).	tonnes	106,800
General and putrescible wastes	Contractor crib rooms, accommodation facilities, administration building, warehouse, workshops, CHPP	Data sourced from XCQ's operating coal mines and scaled for the Project.	tonnes per year	1,850
Non-hazardous waste recycled/ reused	Contractor crib rooms, accommodation facilities, administration building, warehouse, workshops, CHPP	Includes construction paper and cardboard, glass, recyclable plastics, rubber and aluminium cans. Data sourced from XCQ's operating coal mines and scaled for the Project.	tonnes per year	1,150
Scrap metal recycled	Contractor crib rooms, accommodation facilities, administration building, warehouse, workshops, CHPP, maintenance and fabrication of machines and equipment and the replacement of machinery parts.	Data sourced from XCQ's operating coal mines and scaled for the Project.	tonnes per year	1,450
Batteries	Mobile phones, radios, vehicles, equipment, etc	Data sourced from XCQ's operating coal mines and scaled for the Project.	tonnes per year	75
Oils (synthetic and mineral)	Routine servicing and shutdown overhaul of vehicles and equipment in workshops, including synthetic and mineral oils	Data sourced from XCQ's operating coal mines (defined as 'Hazardous waste recycled/reused') and scaled for the Project.	tonnes per year	2,050
Grease	Waste grease from the accommodation facility kitchens, workshop, shutdowns and dragline maintenance			
Hydrocarbons and hydrocarbon contaminated materials	Routine servicing and shutdown overhaul of vehicles and equipment in workshops and maintenance facilities, refuelling and fuel storage facilities. Construction and assembly of the draglines and other mining equipment.	Data sourced from XCQ's operating coal mines (defined as 'Hazardous waste disposal') and scaled for the Project. Assumed to include regulated waste.	tonnes per year	2,100

Waste material	Waste sources	Basis of calculation	Units	Quantity
Empty waste oil containers	Small and bulk drums and containers that typically contain oils and greases.			
Sealers, resins, solvents and paint materials	Routine servicing and shutdown overhaul of vehicles and equipment in workshops, construction of conveyors, construction and assembly of the draglines and other mining equipment.			
Oil and air filters	Routine servicing and shutdown overhaul of equipment in the workshop.			
Blasting residue (from use of ANFO explosive, boosters and detonator)	Blasting of overburden	Quantity of ANFO sourced from XCQ's base calculations for the Project. Assume 40% mass equivalent of explosive, forms waste residue (Kellehr 2002).	tonnes per year	14,900
Conveyor belts	Conveyor operation and maintenance	Data sourced from XCQ's operating coal mines and scaled for the Project.	metres per year	9,000
Tailings (including process water)	Coal handling, preparation and processing	Refer to Supplementary EIS Volume 1, Chapter 6 Project Operations, section 6.4.4.	—	—
Coarse rejects	Coal handling, preparation and processing	Refer to Supplementary EIS Volume 1, Chapter 6 Project Operations, section 6.4.4.	—	—
Discharge from vehicle washdown	Vehicle washdown facilities at MIA	Assume operational vehicle fleet of 68 heavy vehicles and 160 light vehicles, requiring washdown once every three weeks. Assume discharge from washdown: Heavy vehicle = 200 litres; Light vehicle = 70 litres.	kilolitres per year	420
Tyres	Maintenance of vehicles	Assume wheeled operational vehicle fleet of 54 heavy vehicles requiring annual tyre change.	number per year	320
		Assume operational vehicle fleet of 160 light vehicles requiring tyre change once every two years.	number per year	320
Sewage and wastewater	Contractor crib rooms, accommodation facilities, administration building, warehouse, workshops, CHPP	Volumetric contribution of Project to upgraded Wandoan WWTP. Refer to Supplementary EIS Volume 1, Chapter 11 Water Supply & Management, section 11.4.2.	kilolitres per year	45,000
Wastewater treatment plant sludge	Contribution of the mine site sewage and wastewater to the Wandoan Wastewater Treatment Plant	Volumetric fraction of solids in the sewage effluent from the mine site into the upgraded Wandoan WWTP. Refer to Supplementary EIS Volume 1, Chapter 11 Water Supply & Management, section 11.4.2.	tonnes per year	14

Waste storage

Prior to collection from the MLA areas by licensed contractors, for both the construction and operational phases, wastes will be stored relatively close to the point of generation to limit handling of wastes.

Five key locations of the Project will have waste storage facilities:

- Coal Processing Plant (CPP)
- accommodation facilities
- main gate and security building
- mine infrastructure area, including the dragline facility
- gas-fired power station (if constructed).

Other construction and operational areas may also have smaller waste storage units, with waste potentially being removed directly from these points by licensed contractor or moved to the closest of one of the five areas listed above.

Environmental protection commitments (for non mineral wastes)

The WJV provides the following commitments for the management of non-mineral waste generated from all mining activities:

1. In the management of non-mineral waste generated in carrying out the mining activities, comply with the environmental protection objectives for air, water, noise and rehabilitation described in this EM Plan.
2. Minimise, so far as is practicable, the areas of land within the MLA areas used for the disposal of non-mineral waste.
3. Design, construct and maintain facilities for the storage or disposal of wastes so as to reduce the risk of contamination, caused by an escape of non-mineral waste from the storage or disposal areas, to both lands outside the storage and disposal areas and to surface waters or groundwater.
4. Prepare, implement and update progressive Waste Management Plans to include the following:
    - identification of reasonable and practicable strategies and measures for waste minimisation, the collection, segregation, recycling, re-use of waste that has a beneficial use, storage and/or disposal of solid, liquid or hazardous non-mineral waste which may be taken from the controls strategies listed in Table 27A-27 (or equivalent or better measures)
    - characterisation of waste streams and quantities
    - consideration of the waste management hierarchy when selecting waste management strategies, with emphasis on minimising waste
    - training of all personnel on procedures concerning waste minimisation, handling, storage, reuse, segregation, collection and disposal
    - waste removal and transport from site by appropriately licensed contractors with disposal only to licensed reprocessing, recycling or waste disposal facilities
    - procedures for the transportation and tracking of hazardous or regulated waste, as necessary
    - monitoring waste streams and identifying opportunities for reduction and reuse of wastes
    - emergency response procedures for dealing with leaks and spills of fuels and chemicals and other incidents that may impact on waste management
    - emergency spill response equipment storage and training
    - design specifications for the containment, storage and transport of general and liquid wastes
    - design specifications for the containment, storage and transport of hydrocarbons, hydrocarbon contaminated materials, other chemical wastes and batteries
    - procedures for the burning of green waste
    - a register of sites used for the storage and disposal of waste
    - re-use of waste having a beneficial use
    - auditing of the Waste Management Plans.

Control strategies (for non-mineral wastes)

The following are the control strategies which may be incorporated into the Waste Management Plan where appropriate to achieve the waste management commitments.

Table 27A-27 Control strategies or measures

Type	Strategy or measure
Resource reuse	Reuse or recycling of resources that are otherwise wastes, such as metal, paper and cardboard
Green Waste	Suitable material to be used on site to provide fauna habitat. Remaining material to be chipped and mulched, and reused during progressive rehabilitation and revegetation. Green waste will be burned as a last resort if beneficial reuses cannot be found, in accordance with the following principles: ensuring appropriate buffer distances and fire breaks around asset protection zones, including WJV, public and other privately owned assets, protected areas, important vegetation communities and habitats of species under favourable wind conditions to minimise risk of harm to sensitive receptors prior and informed notice provided to adjacent landowners.
Building – Demolition and Construction Waste	Stored onsite in designated waste transfer areas and regularly removed for disposal to a facility that is lawfully able to accept waste. If construction and demolition waste is separated into its constituent parts, the inert parts may be used as clean fill. Inert waste may include bricks/pavers/ceramics, concrete, and clean earthen fill. Any asbestos encountered in demolition or construction activities will be removed and disposed of by a specialist contractor.
General Waste	Collected in bins, stored in designated waste transfer areas and periodically removed for disposal by licensed contractors to a facility that is lawfully able to accept the waste.
Hydrocarbons, hydrocarbon contaminated materials, other chemical wastes, batteries –	Stored in bunded areas then removed by licensed contractor to a facility that is lawfully able to accept the waste for reuse, reprocessing, recycling or disposal. Liquid wastes will be stored in suitable containers within bunded areas.
Tyres	If possible, tyres will be removed by the tyre supplier for recycling, or used onsite for road barriers and demarcation. Otherwise tyres will be stored in accordance with the following principles: tyres awaiting disposal or transport for take-back, will be stockpiled in volumes less than 3 m in height and 200 m2 in area fire precautions will include removal of grass and other flammable materials within a 10 m radius of the tyre store. tyres will be stored in a manner that prevents water retention and minimises mosquito breeding events. Tyres may be disposed of in mined out pits where tyres are placed as deep in the void as possible. Placement will ensure scrap tyres do not impede saturated aquifers and do not compromise the stability of the final landform.

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule E – Waste (non mineral)

E1-1 This authority authorises the release to the environment:

a) To land by the storage and disposal of non-mineral waste generated in carrying out the mining activities.

b) To air and water contaminants generated in the storage and disposal of such non-mineral wastes.

c) To air smoke generated in the burning of green waste when permitted;

in accordance with the conditions of this Schedule E.

E1-2 Non-mineral wastes that may be stored or disposed of and the locations at which they may be stored or disposed of are contained in Schedule E Table 1.

Schedule E: Table 1: Waste storage and disposal

Waste streams	Location for storage or disposal
Green waste	Temporary storage – stored on site within the MLA areas close to the point of generation prior to reuse or disposal Disposal – by burning generally in accordance with the Waste Management Plan
Demolition and Construction Waste	Temporary Storage – prior to reuse, disposal or collection from the MLA areas by licensed contractors, stored at: • waste storage units at construction and operational areas close to the point of generation before being transferred to the waste storage facilities; or • the waste storage facilities located near the CPP, accommodation facilities, the main gate and security building, Mine Infrastructure Area or gas fired power station (if constructed) as shown generally on the Mining Activities Plan. Disposal – in accordance with the Waste Management Plan
Other wastes (including general and regulated wastes)	Temporary storage - Prior to collection from the MLA areas by licensed contractors, stored at: • waste storage units at construction and operational areas close to the point of generation before being transferred to the waste storage facilities; or • the waste storage facilities located near the CPP, accommodation facilities, main gate and security building, Mine Infrastructure Area or gas fired power station (if constructed) as shown generally on the Mining Activities Plan.
Tyres	Temporary Storage - Stockpiles awaiting removal within the Mine Infrastructure Area Disposal – Mined-out pits

E1-3 Prepare, implement and update a Waste Management Plan to meet condition (E1-1) which contains reasonable and practicable measures addressing the collection, segregation, storage and disposal of non-mineral waste.

E1-4 The measures for environmental management described in Schedule E Table 2 must be implemented in the storage and disposal of non-mineral wastes generated in carrying out the mining activities.

Schedule E: Table 2: Non-mineral waste management measures

Measures
General All facilities for non-mineral waste storage and disposal will: a) Be designed, constructed operated and maintained in accordance with generally accepted engineering standards. b) Be incorporated within the site water management system described in Schedule C Table 7.

E1-5 The non-mineral wastes described in Schedule E Table 3 may be reused in carrying out the mining activities as shown in Schedule E Table 3.

E1-6 A register shall be maintained of all areas used for the storage and disposal or beneficial reuse of non-mineral waste.

Schedule E: Table 3: Reuse of non-mineral wastes

Waste	Reuse
Recyclables	Cardboard, paper, metals, plastics and glass may be reused on-site by the WJV, or removed off-site by a licensed recycling or waste contractor.
Green Waste	Reuse on site as fauna habitat, or chipped and mulched for use in rehabilitation or re-vegetation on site.
Tyres	Reuse on site for road barriers and demarcation on site on the haul roads.
Demolition and construction waste	Reprocessing and reuse on site where practicable, or where reuse is not available for construction purposes, reuse as clean fill on site.

27A.2.6 MINERAL WASTE

SUMMARY OF VALUES AND IMPACTS

This section of the EM Plan covers Mineral Wastes (such as fine rejects (tailings), coarse rejects, spoil, overburden, interburden and partings).

The EIS and Supplementary EIS have identified the range and characteristics of mineral waste generated in carrying out the mining activities, and have described strategies for the storage and disposal of the mineral waste on the MLA areas.

The differentiation of waste streams into coarse rejects and fine rejects (tailings) is based on particle size, and for the Project, tailings will consist of waste material less than 2 mm in particle size diameter.

Based on the analysis undertaken for the Supplementary EIS, indicatively for approximately 30 million tonnes ROM coal per year extraction, typically up to about 15 million cubic metres of coarse and fine reject storage combined will be required each year. This figure may fluctuate with extraction from various pits and production throughput given the characteristics of the ROM coal for each pit.

Generally, coarse rejects will be mixed with overburden, interburden and partings and disposed of in both in-pit and out-of-pit dump faces over the life of the Project, while tailings will be stored in mined-out pit voids (referred to as tailings storage facilities) in MLA areas 50230 and 50231.

In the first year of mining, coarse rejects will be dumped adjacent to the Austinvale North Pit along with the overburden from the excavation of Austinvale North Pit. Coarse rejects disposal will be included in the majority of the overburden stockpiles within MLA areas 50230 and 50231. The stockpiles will then be covered in topsoil and rehabilitated.

For tailings (fine rejects), tailings slurry will be pumped from the CPP to mined-out pit voids (tailings storage facilities) to a level below the natural ground surface. Tailings will generally be deposited in large cells within the mined-out voids, generally in accordance with the strategy outlined in Chapter 6 of the Supplementary EIS. For storage of tailings produced in Year 1 of the Project, a truck and excavator pit will be excavated. This will be located in the Austinvale North Pit.

Below-ground storage of fine reject waste in mined-out pits will be monitored for seepage to establish the potential for groundwater infiltration.

The Mining Activities Plan generally describes the storage locations for tailings, coarse rejects, overburden, interburden and partings.

Depending on the ultimate composition of tailings the tailings storage facilities may be considered to be dams containing hazardous waste. Therefore, tailings storage facilities will be tested against the criteria for determining the hazard category of dams containing hazardous waste described in section 27A.2.3 of this EM Plan (Water). Mineral waste will also be tested for an acid producing potential. The WJV will adopt a risk based approach for these assessments, which will be influenced by:

- the concentration of characteristics of liquid and solid contents within the storage
- the potential for a storage to spill or release its contents and cause adverse environmental harm
- the potential for a storage to fail (dam break) and release its contents to cause adverse environmental harm.

The relevant chapters of the EIS and Supplementary EIS are Volume 1 Chapter 6 Project Operations and Chapter 11 Water Supply and Management.

Environmental Protection Commitments (for Mineral Wastes)

In managing the release of mineral waste generated from all mining activities, the WJV provides the following commitments:

1. In the management of mineral waste generated in carrying out the mining activities, comply with the environmental protection commitments for air, water, noise and rehabilitation described in this EM Plan.
2. In the disposal of mineral waste endeavour to minimise, as far as practicable, the out-of-pit disposal areas.
3. Sample and analyse mineral waste to determine if it is hazardous or has acid producing potential both prior to the construction of any mineral waste disposal facility and regularly during the use of each facility.
4. Design, construct and maintain mineral waste storage facilities to appropriate engineering standards generally in accordance with Volume 1 Chapter 6, Chapter 9 and Chapter 11 of the Supplementary EIS, so as to reduce the risk of contamination caused by an escape of mineral waste from the storage areas, to both lands outside the disposal areas and to surface waters or groundwater.

Control strategies (for mineral wastes)

The following are the control strategies which may be applied where appropriate to manage mineral waste generated by the mining activities (recognising that equivalent or better control strategies may also be developed over the life of the Project).

Table 27A-28 Mineral waste control strategies

Streams	Sources	Control strategies
Overburden and interburden	Site preparation and excavation of ROM coal	Disposal to mineral waste storage facilities as indicatively shown in the Mining Activities Plan in accordance with the following disposal principles: • overburden to be deposited with coarse rejects, interburden and partings • overburden will be capped with subsoil and topsoil unless trials show that overburden is suitable for direct revegetation • overburden will be shaped to provide a gently undulating landform.
Tailings	Coal handling, preparation and processing	Fine particulates from the coal processing will be disposed to tailings storage facilities, to a level below the natural ground surface as indicatively shown on the Mining Activities Plan and generally in accordance with the following principles: • tailings will be disposed of in large cells which will be constructed having regard to engineering standards, as appropriate, such as: ‣ Code of Environmental Compliance for Environmental Authorities for High Hazard Dams containing Hazardous Waste ‣ Department of Mines and Energy Technical Guidelines for the Environmental Management of Exploration and Mining in Queensland (1995) ‣ ANCOLD Guidelines on Tailings Dam Design, Construction and Operation ‣ ANCOLD Guidelines for Design of Dams for Earthquake. Typical tailing storage facility design parameters include: • tailings storage area batter angles of around 45° • overburden angle of repose of around 35° • an overall swell factor of 1.20 • adequate freeboard below surface level of the surrounding topography • cells will be designed and constructed to allow efficient dewatering of the tailings and improved recovery of water for recycling to the CPP • covering by up to approximately 20 m of overburden material.
Coarse rejects	Coal handling, preparation and processing	Disposal of coarse rejects will be to mineral waste storage facilities as indicatively shown in the Mining Activities Plan and generally in accordance with the following principles: • coarse rejects to be mixed with truck and excavator overburden material at in-pit and out-of-pit dump faces • coarse rejects to be deposited with overburden, inter-burden and partings and to be included in the majority of overburden stockpiles within MLA areas 50230 and 50231 • profiled stockpiles to be covered in topsoil as part of rehabilitation and revegetation process.
Potential acid producing material	All	The following are examples of measures to be applied where appropriate to monitor for and manage acid producing potential in overburden and interburden: • characterisation of tailings and coal rejects acid producing potential, based on tailings produced during bulk sample operations, prior to commencement of mining • laboratory characterisation of selected samples of tailings material during the tailings disposal process to confirm the acid generation potential • records will be kept of tailings disposal to indicate locations and characteristics of tailing stored within the tailings storage facility. If identified by testing, and to prevent land contamination from potentially acid forming overburden, suitable control strategies will be implemented, such as selectively placing any such materials and covering with acid neutralising

Streams	Sources	Control strategies
		overburden.
General	All	Strategies and measures relevant to Air, Water, Noise generation and Land rehabilitation as described elsewhere in this EM Plan.

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule F – Mineral waste

F1-1 This authority authorises the release to the environment:

a) to land by the disposal of mineral waste generated in carrying out the mining activities

b) to air and water, contaminants generated in the disposal of mineral wastes

only in accordance with the conditions of this Schedule F.

F1-2 Mineral wastes that may be disposed of and the locations at which they may be disposed of, are indicatively described in the Mining Activities Plan.

F1-3 The measures for environmental management described in Schedule F Table 1 (or equivalent or better measures) will be implemented in the disposal of mineral wastes generated in carrying out the mining activities.

Schedule F: Table 1: Control strategies or measures

Measure
Prior to construction of any mineral waste storage facility, undertake a risk assessment, in accordance with generally accepted standards to determine if: a) the mineral waste is a hazardous waste or has acid producing potential b) the mined pit is a hazardous dam.
All mineral waste storage facilities will: a) be designed, constructed, operated and maintained in accordance with generally accepted engineering standards having regard to the risk assessment determination made in accordance with measure 1 b) be incorporated within the site water management system described in Schedule C Table 7.
Prior to commencement of construction of any mineral waste storage facility that is a hazardous dam, a copy of the risk assessment determination referred to in measure 1 and the design plans and specifications prepared in accordance with measure 2 will be submitted to the Administering Authority.
As soon as reasonably practicable after completion of construction of any mineral waste storage facility that is a hazardous dam, a copy of as constructed plans will be provided to the Administering Authority.
For each mineral waste storage facility which has been determined to be a hazardous dam, an annual inspection reviewing the condition of the dam against the design and as constructed plans shall be undertaken in accordance with generally accepted engineering standards and: a) a written report about that inspection shall be provided to the administering authority b) any recommended actions or maintenance to ensure that the dam is in accordance with the design and construction plans and specifications shall be undertaken as soon as is reasonably practicable.
Mineral wastes will be regularly sampled and analysed to ensure that only mineral wastes appropriate for each mineral waste storage facility, having regard to the risk assessment determination referred to in Measure 1, are disposed of in each facility.
For each mineral waste storage facility which has been determined to be a hazardous dam, a monitoring program will be implemented for groundwater and land contamination.

F1-4 The mineral waste described in Schedule F Table 2 may be reused in carrying out the mining activities shown in that Table 2.

Schedule F: Table 2 Reuse of mineral waste

Waste	Reuse
Coarse rejects/spoil, overburden, interburden and partings	Reuse on site for civil works such as road constructions, where the criteria for clean fill are met

F1-5 A register shall be maintained of all areas used for the disposal or reuse of mineral waste.

27A.2.7 LAND AND REHABILITATION

SUMMARY OF VALUES AND IMPACTS

The EIS has determined that all land within the MLA areas can be classed as Land Suitability Class 2 for beef cattle grazing or Land Suitability Class 3 or 4 for dry land cropping. Classes 2, 3 and 4 are defined as follows:

- 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 land with severe limitations which make it doubtful whether the inputs required to achieve and maintain production outweigh the benefits in the long-term.

For the Supplementary EIS, the pre-mining land suitability of the MLA areas for dry land cropping was reassessed with revised nutrients deficiency and water erosion criteria.

The revised mapping classified the majority of the MLA areas as Class 3 for cropping, with some upper slopes being classified as Class 4 due to shallow soil depth limiting pore water holding capacity and erosion potential. Small portions of land on the upper floodplains could be considered Class 2 for dry land cropping.

The currently dominant land uses in the area, beef cattle grazing with some cropping, correlates well with the land suitability assessment.

The EIS identified a range of potentially contaminating activities having occurred, or currently occurring, on lands within the MLA areas, including burial of waste, pesticide usage, storage of petroleum products and presence of stock dips or cattle races.

The potential impacts on land resources from disturbances by mining activities identified in the EIS include:

- land suitability changes
- possible land use changes
- changes to or redistribution of existing landforms (for example by creek diversions and the addition of overburden stockpiles and final voids)
- possible land contamination.

The Supplementary EIS has estimated that the areas of land under each suitability class pre-mining and at Year 30 as shown in Table 27A-29.

In terms of land suitability for dry land cropping, the Project will likely result in a reduction in Class 3 cropping land by 8,113 ha, and the introduction of 3,407 ha of Class 5 cropping land. The Class 5 land comprises the rehabilitated final voids and ramps, sediment and environmental dams, as well as steeper sections of overburden stockpiles.

Table 27A-29: Pre and post-mining land suitability areas

Land suitability class	Estimated area of land (ha)			
	Pre-mining dry land cropping	Post-mining dry land cropping	Pre-mining beef cattle grazing	Post-mining beef cattle grazing
2	0	0	32,191	28,784
3	26,335	18,222	0	0
4	5,856	10,562	0	3,407
5	0	3,407	0	0

The final landform land suitability classes and expected land uses are presented in Table 27A-30.

Table 27A-30: Post-mining land use

Mining activity	Post-mining land use	Post-mining land suitability class for dry land cropping	Post-mining land suitability class for beef cattle grazing
Infrastructure including roads, MIA, etc	Beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 3 and Class 4	Class 2 and Class 3
Low gradient overburden disposal stockpiles including tailings disposal	Beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 4	Class 2
Steeper gradient overburden disposal stockpiles	Low density beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 5	Class 4
Final voids	Low density beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 5	Class 4
Creek Diversions	Creeks	Not Applicable	Not Applicable
Water Storage Dams	Either retained for subsequent agricultural use or remediated and rehabilitated for beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use), or native bushland	Class 4	Class 2
Sediment Dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use), or native bushland	Class 4	Class 2
Environmental dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use), or native bushland	Class 4	Class 2
Any contaminated land (within the meaning of the Environmental Protection Act 1994) so as not to be able to be used for other post mining land uses nominated in this Table	A use consistent with a contaminated site management plan for the area.	Not Applicable	Not Applicable

The relevant chapters of the EIS and Supplementary EIS are Volume 1 Chapter 6, Project Operations; Chapter 9 Geology Mineral Resources, Overburden and Soils; and 25 Rehabilitation and Decommissioning.

Environmental protection commitments

In managing the rehabilitation of the land disturbed by mining activities within the MLA areas, the WJV provides the following commitments.

1. To rehabilitate progressively the areas used for mining activities within two years of areas becoming available for rehabilitation and which are no longer required for mining activities, so as to be able to sustain the post mining land uses and to achieve the land suitability classes for those areas as generally described in Table 27A-30.
2. To minimise the area of land disturbed by mining activities consistent with the extraction of minerals permitted under the mining tenements for the Project.
3. To remove all buildings, structures and equipment inconsistent with the proposed post mining land use unless the landowner has agreed that the items need not be removed.

4. To incorporate in the rehabilitation works measures aimed at:
   a) Ensuring the land is suitable for the post-mining land use.
   b) Maintaining downstream and groundwater water quality.
   c) Minimising soil erosion, the release of dust and seepage of water.
   d) Ensuring stability of the land forms so as to be suitable for the post mining land uses.
   e) Revegetating the disturbed areas so as to be suitable for the post mining land uses.
   f) Implementing the requirements of any Site Management Plan applicable to any part of the MLA areas contaminated by the mining activities.
5. During the life of the Project to monitor and maintain areas which have been rehabilitated.

Control Strategies

The following are operational control strategies which may be applied where appropriate to achieve the rehabilitation commitments (recognising that equivalent or better control strategies may also be developed over the life of the Project).

1. The decommissioning of the mine and mine infrastructure will be carried out generally in accordance with the Enduring Value – Australian Minerals Industry Framework for Sustainable Development (to which Xstrata Coal is a signatory), Xstrata Coal's Mine Rehabilitation Review Procedure and Mine Closing Planning Policy, the EPA's Guideline 18 Rehabilitation requirement for mining projects (EPA 2007) and Leading practice sustainable development program for the mining industry: Mine Rehabilitation (Department of Industry, Tourism and Resources 2006) (or equivalent policies available at the time of decommissioning).
2. Topsoils and subsoils will be stripped from disturbed areas and stockpiled for use in rehabilitation of disturbed areas.
3. During rehabilitation soil profiles will be created from the application of subsoil and topsoil. Selection of topsoil and subsoil will be based on suitable properties and depth for rehabilitation/long term soil success for a sustainable post mining land use,
4. In addition to the above general control strategies, rehabilitation strategies will broadly include plans for:
   - erosion and sediment control
   - biodiversity and land management
   - weed management
   - topsoil management
   - overburden dump construction
   - rehabilitation and revegetation
   - stormwater management
   - permit to disturb system.
5. The rehabilitation strategy will detail, based on the analysis contained in the EIS and Supplementary EIS (Chapters 6, 9 and 25):
   - rehabilitation objectives
   - reference sites and rehabilitation sites to be used for developing appropriate rehabilitation criteria and for rehabilitation monitoring
   - end of mine landform design and post-mining land use across the mine
   - schematic representation of the final landform, inclusive of:
     - drainage design and features
     - slope design
     - cover design
     - erosion controls proposed on reformed land.
   - planned nature conservation rehabilitation areas and corridors within the MLA areas
   - soil and overburden characteristics and handling requirements
   - planned rehabilitation methods for disturbed areas
   - revegetation criteria

- rehabilitation monitoring and maintenance planned to be applied to areas of disturbance
- monitoring methodology of rehabilitation and reference sites.

PROPOSED ENVIRONMENTAL AUTHORITY CONDITIONS

Schedule G – Land rehabilitation

G-1 Rehabilitate progressively the land to post mining land uses and achieve the land suitability classifications for those areas as generally described in Schedule G Table 1 by undertaking reasonable and practicable measures to:

a) Remove all buildings structures and equipment inconsistent with the post mining land uses (unless the landowner has agreed the items may not be removed).

b) Maintain downstream and groundwater water quality.

c) Minimise soil erosion, release of dust, and seepage of waters.

d) Ensure land is stable so as to be suitable for the relevant post mining use.

d) Revegetate the disturbed areas with species appropriate for the relevant post mining land use.

e) Implement the requirements of any Site Management Plan applicable to any part of the MLA areas contaminated within the meaning of the Environmental Protect Act.

Schedule G: Table 1 Post-mining land use

Mining activity	Post-mining land use	Post-mining land suitability class for dry land cropping	Post-mining land suitability class for beef cattle grazing
Infrastructure including roads, MIA, etc	Beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 3 and Class 4	Class 2 and Class 3
Low gradient overburden disposal stockpiles including tailings disposal	Beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 4	Class 2
Steeper gradient overburden disposal stockpiles	Low density beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 5	Class 4
Final voids	Low density beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use) or native bushland	Class 5	Class 4
Creek Diversions	Creeks	Not Applicable	Not Applicable
Water Storage Dams	Either retained for subsequent agricultural use or remediated and rehabilitated for beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use), or native bushland	Class 4	Class 2
Sediment Dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable land use), or native bushland	Class 4	Class 2
Environmental dams	Either retained for subsequent agricultural use or remediated and rehabilitated to beef cattle grazing (subject to the findings of trials confirming grazing as a sustainable	Class 4	Class 2

Mining activity	Post-mining land use	Post-mining land suitability class for dry land cropping	Post-mining land suitability class for beef cattle grazing
	land use), or native bushland		
Any contaminated land (within the meaning of the Environmental Protection Act 1994) so as not to be able to be used for other post mining land uses nominated in this Table	A use consistent with a contaminated site management plan for the area.	Not Applicable	Not Applicable

G-2 Areas to be rehabilitated shall be rehabilitated progressively commencing within 2 years after the relevant areas are no longer required for mining activities and become available for rehabilitation.

G-3 Prior to undertaking the rehabilitation of any areas, carry out an investigation by identifying at least two reference sites not disturbed by mining activities which are representative of vegetation types appropriate for the proposed post mining land use, to determine the acceptance criteria for the vegetation to be established in the area to be rehabilitated and submit a written report to the administering authority.

G-4 Monitor and, if necessary, maintain, areas which have been rehabilitated so that the rehabilitated areas may be used for the post mining land uses listed in Schedule F Table 1 upon the cessation of mining activities.

G-5 Prior to undertaking the rehabilitation of any contaminated land (within the meaning of the Environmental Protection Act 1994), a site management plan including a statement about the post mining use for the land will be prepared and submitted to the administering authority.

G-6 All measures to be undertaken in the rehabilitation of lands will be described in successive Plans of Operations for the periods in which rehabilitation will occur.

G-7 Prior to the cessation of mining activities in any area which will include a residual void, carry out an investigation to address void hydrology and pit wall stability and to determine appropriate rehabilitation works for the void and submit a written report to the administering authority.

Note: * These figures will continue to be refined during the detailed design phase.

G-8 All rehabilitation works will be undertaken in accordance with generally accepted engineering standards and in particular, rehabilitation of all land formations will be generally in accordance with a slope gradient conducive to the post-mining land uses provided in Schedule G Table 1.

27A.2.8 DEFINITIONS

SCHEDULE H – DEFINITIONS

"Acceptance Criteria" means the standards to indicate the success of the rehabilitation outcome of areas which have been significantly disturbed by the mining activities and which criteria may include information regarding:

- post mining landform
- overburden and soil management
- post mining land use and land suitability classification
- vegetation establishment, survival and succession
- vegetation productivity, sustained growth and structure development
- fauna colonisation and habitat development
- ecosystem processes such as soil development and nutrient cycling, and the recolonisation of specific fauna groups such as collembola, mites and termites which are involved in these processes
- microbiological studies including recolonisation by mycorrhizal fungi, microbial biomass and respiration
- effects of various establishment treatments such as deep ripping, topsoil handling, seeding and fertiliser application on vegetation growth and development
- resilience of vegetation to disease, insect attack, drought and fire

- vegetation water use and effects on groundwater levels and catchment yields
- for land contaminated by mining activities, a statement about the use for which the land is suitable.

"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.

"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.

"Dam" means a containment or proposed containment whether permanent or temporary, which is designed to contain, divert or control flowable substances but does not include a fabricated or manufactured tank or container designed to a recognised standard.

"Equipment and plant" means any machinery, equipment or plant (whether movable or stationary) used for carrying out mining activities, and includes monitoring equipment.

"Flowable Substance" means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

"Hazardous waste" means waste, that if improperly treated, stored, disposed of or otherwise managed, may be reasonably expected to cause serious environmental harm.

"Hazardous Dam" means a dam which is so located that either spills or releases or the collapse of the dam structure may reasonably be expected to cause serious environmental harm.

"High Management Zone" refers to the mining area within a 2km radius of the Wandoan Township.

"LA 10, adj, 10 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.

"LA 1, adj, 10 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

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

"Mine Infrastructure Area" means the indicative area within the MLA areas shown in the Mining Activities Plan where the mine infrastructure will generally be located.

"Mineral Waste" means waste from land generated from the extraction of coal, such as overburden, inter-burden, tailings (fines), coarse rejects and spoil, but not including non-mining waste.

"Mineral Waste Storage Facility" means mined-out pit voids used for disposal of tailings, rejects and overburden, and includes tailings storage facilities.

"Mining Activities Plan" means the annexed, indicative plan forming part of the Environmental Authority showing the general location of all mining activities, and as may be updated from time to time under successive plans of operations, and otherwise described as Figure 27A-1-V1.3.

"Non-Mineral Waste" waste generated in carrying out the mining activities, including green waste, building and construction waste, general waste and waste tyres, but not including waste from land generated from the extraction of coal such as overburden, inter-burden, tailings (fines), coarse rejects and spoil.

"Noxious" means harmful or injurious to health or physical well being.

"Offensive" means causing reasonable offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive.

"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).

"Rehabilitation" the process of reshaping and revegetating land to restore it to a stable landform in accordance with the acceptance criteria and, where relevant, includes remediation or management of contaminated land.

"Receiving Areas" means areas shown on the Receiving Areas Plan within which potential impacts from noise or dust from the mining activities may occur, which are represented by sensitive receptor locations at which

(or in the vicinity of) monitoring of noise, dust and vibration is undertaken by the WJV. Receiving areas include:

- Town
- Woleebee West
- Woleebee South
- Leichhardt
- Mud Creek
- Turkey Hill.

"Receiving Areas Plan" means the annexed plan forming part of the Environmental Authority showing the general location of the Receiving Areas and representative sensitive locations, otherwise described as Figure 27A-2-V1.3

"Residual Void" means an open pit resulting from the removal of ore and/or waste rock which will remain following the cessation of all mining activities and completion of rehabilitation processes.

"Sensitive Receptor" means:

a) Dwelling.

b) Library.

c) Education institution.

d) Childcare centre and kindergarten.

e) Hospital, surgery or medical institution.

"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.