

Permit¹

Environmental Protection Act 1994

This environmental authority is issued by the administering authority under Chapter 5 of the Environmental Protection Act 1994.

Permit¹ number: EPML00658213

The amalgamated environmental authority takes effect on the date the delegate signs this document.

The anniversary date of this environmental authority remains **30 December**. An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Queensland Energy Resources (Aussun) Pty Limited	Level 10, 200 Mary Street BRISBANE QLD 4000
Queensland Energy Resources (No. 1) (Stuart) Pty Ltd	Level 10, 200 Mary Street BRISBANE QLD 4000
Queensland Energy Resources (No. 2) (Stuart) Pty Ltd	Level 10, 200 Mary Street BRISBANE QLD 4000

Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
Mining - ML other - 20, Site Specific • ERA 7(4)(b) Chemical manufacturing • ERA 8(3) Chemical storage • ERA 10 Gas producing • ERA 11(c) Oil refining or processing • ERA 15 Fuel burning • ERA 31(2)(b) Mineral processing • ERA 33 Crushing, milling, grinding or screening • ERA 50(1)(a) Bulk material handling • ERA 56 Regulated waste storage • ERA 60(1)(d) Waste disposal • ERA 61(3)(b) Waste incineration and thermal treatment • ERA 63(b)(i) Sewage treatment	ML80003

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation



In respect of carrying out Level 1 and Level 2 petroleum activities under Section 23 and under Schedule 5 of the Environmental Protection Regulation (2008)

Activity	Description
Schedule 5, No. 8	A petroleum activity, other than a petroleum activity mentioned in items 1 to 7, that includes a chapter 4 activity for which an aggregate environmental score is stated.

On the relevant petroleum authorities identified below:

Relevant petroleum tenement(s)	Project Name	Location Description
Petroleum Facility Licence 8	Shale to Liquids Technology Demonstration Plant	375 Landing Road Yarwun Industrial Estate GLADSTONE QLD 4694

Additional information for applicants

Environmentally relevant activities

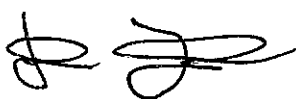
The description of any environmentally relevant activity (ERA) for which an environmental authority is issued is a restatement of the ERA as defined by legislation at the time the approval is issued. Where there is any inconsistency between that description of an ERA and the conditions stated by an environmental authority as to the scale, intensity or manner of carrying out an ERA, then the conditions prevail to the extent of the inconsistency.

An environmental authority authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the authority specifically authorises environmental harm.

A person carrying out an ERA must also be a registered suitable operator under the *Environmental Protection Act 1994* (EP Act).

Contaminated land

It is a requirement of the EP Act that if an owner or occupier of land becomes aware a notifiable activity (as defined in Schedule 3 and Schedule 4) is being carried out on the land, or that the land has been, or is being, contaminated by a hazardous contaminant, the owner or occupier must, within 22 business days after becoming so aware, give written notice to the chief executive.



Signature

John Frankish
Department of Environment and Heritage Protection
Delegate of the administering authority
Environmental Protection Act 1994



Date

Enquiries:
Dept of Environment and Heritage Protection
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GLADSTONE QLD 4680
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Obligations under the *Environmental Protection Act 1994*

In addition to the requirements found in the conditions of this environmental authority, the holder must also meet their obligations under the EP Act, and the regulations made under the EP Act. For example, the holder must comply with the following provisions of the Act:

- general environmental duty (section 319)
- duty to notify environmental harm (section 320-320G)
- offence of causing serious or material environmental harm (sections 437-439)
- offence of causing environmental nuisance (section 440)
- offence of depositing prescribed water contaminants in waters and related matters (section 440ZG)
- offence to place contaminant where environmental harm or nuisance may be caused (section 443)

Conditions of environmental authority

Location: 375 Landing Road, Yarwun Industrial Estate GLADSTONE QLD 4694

Land description: ML80003; PFL8

Relevant activities: ERA 7(4)(b) Chemical manufacturing, ERA 8(3) Chemical storage, ERA 10 Gas producing, ERA 11(c) Oil refining or processing, ERA 15 Fuel burning, ERA 31(2)(b) Mineral processing, ERA 33 Crushing, milling, grinding or screening, ERA 50(1)(a) Bulk material handling, ERA 56 Regulated waste storage, ERA 60(1)(d) Waste disposal, ERA 61(3)(b) Waste incineration and thermal treatment, ERA 63(b)(i) Sewage treatment

Mining - ML other - 20, Site Specific

The activities conducted at the location as described above must be conducted in accordance with the following site specific conditions of approval.

Agency interest: General	
Condition number	Condition
A1	This environmental authority authorises environmental harm referred to in the conditions. Where there is no condition or this environmental authority is silent on a matter, the lack of a condition or silence does not authorise environmental harm.
A2	In carrying out the activities authorised by this environmental authority, disturbance of land: (a) may occur in the areas marked 'A'; and (b) must not occur in the areas marked 'B' on the map that is Annexure 1 to this environmental authority.
A3	Only sub-surface disturbance is authorised within the areas marked 'B' on the map that is Annexure 1 to this environmental authority.

A4	The holder of this environmental authority must: (a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority; (b) maintain such measures, plant and equipment in a proper and efficient condition; (c) operate such measures, plant and equipment in a proper and efficient manner; and (d) ensure all instruments and devices used for the measurement or monitoring of any parameter under any condition of this environmental authority are properly calibrated.
A5	Monitoring Except where specified otherwise in another condition of this environmental authority, all monitoring records or reports required by this environmental authority must be kept for a period of not less than 5 years.
A6	Financial assurance The activity must not be carried out until the environmental authority holder has given financial assurance to the administering authority as security for compliance with this environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the Act.
A7	The amount of financial assurance must be reviewed by the holder of this environmental authority when a plan of operations is amended or replaced or the authority is amended.
A8	Risk management The holder of this environmental authority must develop and implement a risk management system for mining activities which mirrors the content requirement of the Standard for Risk Management (ISO31000:2009), or the latest edition of an Australian standard for risk management, to the extent relevant to environmental management, by 6 months from date of issue.
A9	Notification of emergencies, incidents and exceptions The holder of this environmental authority must notify the administering authority by written notification within 24 hours, after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with, the conditions of this environmental authority.
A10	Within 10 business days following the initial notification of an emergency or incident, or receipt of monitoring results, whichever is the latter, further written advice must be provided to the administering authority, including the following: (a) results and interpretation of any samples taken and analysed; (b) outcomes of actions taken at the time to prevent or minimise unlawful environmental harm; and (c) proposed actions to prevent a recurrence of the emergency or incident.

A11	Complaints The holder of this environmental authority must record all environmental complaints received about the mining activities including: (a) name, address and contact number for of the complainant; (b) time and date of complaint; (c) reasons for the complaint; (d) investigations undertaken; (e) conclusions formed; (f) actions taken to resolve the complaint; (g) any abatement measures implemented; and (h) person responsible for resolving the complaint.
A12	The holder of this environmental authority must, when requested by the administering authority, undertake relevant specified monitoring within a reasonable timeframe nominated or agreed to by the administering authority to investigate any complaint of environmental harm. The results of the investigation (including an analysis and interpretation of the monitoring results) and abatement measures, where implemented, must be provided to the administering authority within 10 business days of completion of the investigation, or no later than 10 business days after the end of the timeframe nominated by the administering authority to undertake the investigation.
A13	Third-party reporting The holder of this environmental authority must: (a) within 1 year of the commencement of this environmental authority, obtain from an appropriately qualified person a report on compliance with the conditions of this environmental authority; (b) obtain further such reports at regular intervals, not exceeding 3 yearly intervals, from the completion of the report referred to above; and (c) provide each report to the administering authority within 90 days of its completion.
A14	Where a condition of this environmental authority requires compliance with a standard, policy or guideline published externally to this environmental authority and the standard is amended or changed subsequent to the issue of this environmental authority, the holder of this environmental authority must: (a) comply with the amended or changed standard, policy or guideline within 2 years of the amendment or change being made, unless a different period is specified in the amended standard or relevant legislation, or where the amendment or change relates specifically to regulated structures, the time specified in that condition; and (b) until compliance with the amended or changed standard, policy or guideline is achieved, continue to remain in compliance with the corresponding provision that was current immediately prior to the relevant amendment or change.

Agency interest: Air	
Condition number	Condition
B1	Point source release of contaminants to the atmosphere Contaminants must only be released to the atmosphere from a release point shown in Schedule B Table 1, and: (a) in accordance with the criteria shown in Schedule B Table 1; and (b) directed vertically upwards, with no impedence.
B2	Contaminants must not be released to the atmosphere from a release point at a mass emission rate and concentration as measured at a monitoring point specified in Schedule H Table 1, in excess of that stated in Schedule B Table 2.
B3	Notwithstanding the release limits for sulphur dioxide, nitrogen oxide and particulates mentioned in Schedule B Table 1, the holder of this environmental authority must implement reasonable and practicable measures to minimise emissions of these contaminants to the atmosphere as part of a continuous improvement program.
B4	Fuel burning from the flares The only fuels that may be burned in industrial fuel burning equipment, excluding mobile plant, are natural gas, diesel, sour gas, refinery fuel gas or any other recycled fuel sourced from the process.
B5	Fire training Fire prevention and control training exercises must be undertaken in a manner that does not cause environmental harm.
B6	Emission control plant All contaminants released via the plant thermal oxidiser stack must be effectively treated in a thermal oxidiser to ensure compliance with the odour condition B15.
B7	All contaminants released via the dryer stack must be effectively treated in a regenerative thermal oxidiser to ensure compliance with the odour condition B15.
B8	All plant units served by the thermal oxidiser must be safely shutdown as soon as practically possible when thermal oxidiser(s) is (are) not operating effectively or fails to operate
B9	The combustion chamber of the plant thermal oxidiser must have a residence time for all gaseous contaminants of not less than two seconds under all operating conditions.
B10	A minimum temperature of 980 degrees Celsius must be achieved at the initial and final measurement points of the combustion chamber of the plant thermal oxidiser.
B11	Temperatures of less than 980 degrees Celsius in the combustion chamber of the plant thermal

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	oxidiser must produce an audible and/or visual alarm and all such alarms must be recorded on an electronic log.
B12	All effluent gases, dust and vapours from the dryer must be effectively collected by the extraction systems serving the plant and must be treated by a Fabric Filter Dust Collector (FFDC) to effectively minimise the release of air pollutants and ensure compliance with this environmental authority.
B13	For the purpose of avoiding any release of combustion gases and other air contaminants from the dryer which could cause an environmental nuisance, at least the following measures must be taken to minimise emissions: (a) timely calibration and maintenance of the thermal oxidiser; (b) the thermal oxidiser must be operating at all times to ensure complete combustion; (c) a device (e.g. differential pressure sensor) which is capable of detecting filter medium breakthrough must be installed in the outlet of the FFDC; (d) an alarm system must warn the operator of the plant of the possibility that filter medium breakthrough has occurred; and (e) the FFDC is maintained in accordance with the manufacturer's operating specifications/instructions.
B14	Flare operation All flares are to be operated to optimize combustion and minimize likelihood of smoky emissions and odours.
B15	Odour Notwithstanding any other condition of this environmental authority, the release of noxious or offensive odour(s) or any other noxious or offensive airborne contaminant(s) resulting from the activity must not cause any environmental nuisance at any odour sensitive place beyond the boundaries of the mining lease. To remove any doubt it is declared that this condition as it relates to environmental nuisance means not causing an unreasonable interference with or likely interference with an environmental value in a way mentioned in subsections (a), (b) or (c) of Section 15 of the <i>Environmental Protection Act 1994</i>.
B16	Primary treated sour water and other potentially odorous materials Primary treated sour water and other potentially odorous materials in any open pond, vessel or place must be treated or managed so as to not cause an environmental nuisance at an odour sensitive place.

SCHEDULE B Table 1 Air Contaminate Release Points and Limits

Source Description	Release Point Description	Minimum Release Height (metres above ground)	Minimum Exit Gas Temperature (°C)	Minimum Efflux Velocity (m/s)
Retort, Oil Processing, and Sour Water Plant	RP1-Plant Thermal Oxidiser Stack (Plant TO)	35	750	10*
Drying Plant	RP2-Dryer Regenerative Thermal Oxidiser Stack (RTO)	9	N/A	10*
Recycle Gas Heaters	RP3-Recycle Gas Heater Stack	35	N/A	N/A
Utility Plant	RP4-Steam Boiler Stack	5	N/A	N/A
Utility Plant	RP5-Hot Water Boiler Stack	4	N/A	N/A
Backup Power Supply Generator	RP6-Generator exhaust	N/A	N/A	N/A
Plant Flare	RP7-Elevated Flare or	15	N/A	N/A
	Enclosed Flare	5		

N/A means none applicable

** Minimum efflux velocity limit is not applicable during the plant's standby mode.*

SCHEDULE B Table 2 Air Mass Emission Rate

Air Quality Indicator	Limit Type	Release Points	Release Limit	RP1 Release Limit Units	RP2 Release Limit Units
Sulphur Dioxide, SO ₂	Maximum	RP1 and RP2 Combined (Plant TO + RTO)	8 (Note 3)	grams per second	grams per second
Nitrogen Oxides, NO _x	Maximum	RP1 and RP2 Combined (Plant TO + RTO)	3 (Note 3)	grams per second	grams per second
Hexavalent Chromium (Cr ^{vi})	Maximum (12 months rolling average)	RP1 and RP2 Combined (Plant TO + RTO)	0.11 (Note 3)	milligrams per second	milligrams per second
Dioxins and Furans	Maximum	RP1 and RP2 (Plant TO, RTO)	0.1	Nanograms TEQ _(WHO) per normal cubic metre at 11% oxygen, dry	Nanograms TEQ _(WHO) per normal cubic metre, dry
Particulates	Maximum	RP1 and RP2 Combined (Plant TO + RTO)	1 (Note 3)	grams per second	grams per second

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Particulates	Maximum	RP1 and RP2 (Plant TO, RTO)	50	milligrams per normal cubic metre at 3 % oxygen, dry	milligrams per normal cubic metre, dry
VOCs (as n-propane equivalent)	Target Maximum (see Note 4)	RP1 (Plant TO)	20	milligrams per normal cubic metre at 3 % oxygen, dry	N/A
	Maximum	RP1 (Plant TO)	40	milligrams per normal cubic metre at 3 % oxygen, dry	N/A
		RP2 (Plant RTO)	20	milligrams per normal cubic metre, dry	milligrams per normal cubic metre, dry

Note 1: In cases where emissions are monitored continuously (90% availability of equipment and associated instrumentation when the retort is operational, to allow for calibrations, planned maintenance and repairs) the maximum applies to a one-hour average. The continuing monitoring instrument of sulphur dioxide and oxides of nitrogen must be accurate to within plus or minus one percent within its operating range.

Note 2: This averaging period does not apply to iso-kinetic sampling.

Note 3: These limits are for the aggregate sum of mass emissions from the two release points RP1 and RP2

Note 4: The Holder is to operate the thermal oxidiser serving RP1 using all endeavours to comply with the target maximum of 20 milligrams per cubic metre at 3% oxygen dry, but may exceed this where necessary for testing the retorting technology.

B17	Dust and particulate emissions Emissions of dust and/or particulate matter resulting from the activities that may cause an environmental nuisance must not be released beyond the boundaries of the licensed place to any dust sensitive place.
B18	An environmental nuisance caused by dust and/or particulate matter includes a release to any dust sensitive place that exceeds any of the following limits at that place: (a) dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10 of 2003; (b) a concentration of particulate matter with an aerodynamic diameter of less than 10 microns (μm) (PM_{10}) suspended in the atmosphere of 50 micrograms per cubic metre (with five one day exceedences allowed in any one year period. These 5 days exceedences per year are included to allow solely for elevated emissions caused by natural events such as bushfires and dust storms.) over a 24 hour averaging time, at a dust sensitive place downwind of the licensed place, when monitored in accordance with: (i) Australian Standard AS 3580.9.6 1990 "Ambient air - Particulate matter - Determination of suspended particulate PM_{10} high-volume sampler with size-selective inlet - Gravimetric method"; or

	(ii) Any alternative method of monitoring PM₁₀ which may be permitted in writing by the administering authority or by the "Air Quality Sampling Manual" as published from time to time by the administering authority; (c) neither deposited dust nor suspended particulate matter must contain a dioxin and furan content exceeding 10ng TEQ/kg. (d) a concentration of particulate matter with an aerodynamic diameter of less than 2.5 microns (µm) (PM_{2.5}) suspended in the atmosphere of 8 micrograms per cubic metre as an annual average nor more than 25 micrograms per cubic metre over any 24 hour averaging period, when monitored in accordance with: (i) Australian Standard "AS/NZS 3580.9.10:2006 Methods for sampling and analysis of ambient air Method 9.10: Determination of suspended particulate matter—PM2.5 low volume sampler— Gravimetric method"; or (ii) any alternative method of monitoring PM₁₀ which may be permitted in writing by the administering authority or by the "Air Quality Sampling Manual" as published from time to time by the administering authority.
B19	All reasonable and practicable measures must be undertaken to minimise emissions of dust and particulate matter to the atmosphere. Reasonable and practicable measures may include but not be limited to: (a) use of water sprays on trafficable areas; (b) handling materials in a moist state; (c) shielding of conveyors and transfer points; (d) dust extraction systems; (e) coverage of dusty materials; (f) enclosure or partial enclosure of dusty preparation and processing operations; (g) monitoring and recording of critical processing conditions and operations; and (h) back-up systems for critical items of plant whose failure would result in material emissions, for example, back-up power and pumps.
B20	The holder must not add air to the dryer flue gas stream, other than air which is necessary for drying and/or processing purposes.
Agency interest: Water	
Condition number	Condition
C1	Release of contaminants to waters Contaminants that may cause environmental harm must not be released from the activities to any waters or the bed and banks of any waters other than in accordance with the contaminant release conditions and limits in Schedule C.

C2	All runoff from the processing plant site and rainfall entrapped in the bunds of the tank farm must be passed through an appropriate treatment system, for example an oily-water separator, prior to its collection in the Clean Water Holding Pond except for processing plant site runoff that exceeds that caused by a storm with a rainfall intensity equal to or greater than 143mm/hour.
C3	The only contaminants permitted to be released to waters from the licensed place at release points WP1 (Clean Water Holding Pond), WP2 (Mine Water Management System) and WP3 (Mine Water Management System Emergency Spillway) are treated/settled process water, mine water and contaminated storm water runoff from the processing area, and stockpiles as mentioned in C4.
C4	Release Points Contaminants from the processing plant and all disturbed areas must not be directly or indirectly released from the licensed place to any waters other than the contaminants and sources at the locations listed below: Release Point WP1 – outlet from pond named “Clean Water Holding Pond” discharging treated / settled process water (excluding any stripped sour water and any flare seal water), mine water transferred into the pond for reuse purposes and contaminated stormwater (excluding contaminated runoff/seepage except as otherwise provided by condition G25) from the processing areas and stockpiles, to Port Curtis. Release Point WP2 - Mine Water Management System outlet discharging treated / settled waste water from the utilities plant, mine water and contaminated storm water runoff (excluding contaminated runoff/seepage except as otherwise provided by condition G25) from the mine, and stockpiles into ‘Gully C’ or ‘Gully D’ or ‘Gully E’ as the mine progresses, which drain into Port Curtis. Release Point WP3 – Emergency overflow spillways serving the Mine Water Management System, discharging contaminants permitted to be discharged via WP2 into ‘Gully C’ or ‘Gully D’ or ‘Gully E’ as the mine progresses, which drain into Port Curtis.
C5	Notwithstanding condition C4, contaminants permitted to be released via WP1 may also be released via WP2 following rainfall events that cause the rainfall design storage requirement of the Clean Water Holding Pond system to be exceeded where such contaminants are transferred into and treated in the Mine Water Management System to reinstate capacity in the Clean Water Holding Pond.
C6	Notwithstanding condition C4, contaminants permitted to be released via WP2 may also be released via WP1 for the sole purpose of managing electrical conductivity levels of waters treated via the in the mine water management system, provided the release limits for WP1 are met.
C7	The mine water management system must have design capacity to hold the runoff expected from a 20-day multi-day wet event with an annual exceedence probability (AEP) of 0.1. In the event that the system fills or is likely to fill given regard to expected average and having regard to demand for reuse of the water on-site or elsewhere, and action is thus needed to restore capacity, the contents may be drawn down and released subject to compliance with the release water quality limits and release conditions.

C8	The direct or indirect release of contaminants from the Clean Water Holding Pond to waters must only occur due to the overflow of the Clean Water Holding Pond caused by rainfall event(s), over a single or multiple days (within any fourteen consecutive day period), producing a volume of runoff in excess of that produced by 434mm of rain over the catchment, as measured at on-site rainfall gauges (where installed, rain gauges must comply with the requirements of the relevant Australian Standard) or the nearest Commonwealth Bureau of Meteorology rainfall recording station. [Note: Until the TD Plant is operational, it is sufficient the retention volume requirements applying to the Mine Water Management System (i.e. 20-day multi-day wet event with an annual exceedance probability (AEP) of 0.1) may be applied to the Clean Water Holding Pond.] <i>Note: Derived from 0.01 AEP 24 hour rainfall event.</i>
C9	The freeboard capacity sufficient to contain the rainfall event(s) described in condition C8, must be re-established within the Clean Water Holding Pond within two (2) weeks from the last day of a 14 day consecutive period which had a total rainfall greater than 434mm. A marker device indicating this freeboard level must be installed and be clearly visible.
C10	Releases from WP3 must only occur as a result of overflow from the spillway, or during emergency events to prevent dam wall failure, in which cases the release will be notified to the administering authority.
C11	Quality characteristics of release to waters The contaminants released to waters must comply with the limits specified in Schedule C Table 1 for each quality characteristic.
C12	Notification of releases The administering authority must be notified of a release of water from site within 24 hours of the commencement of the release.
C13	The release of contaminants to waters must comply with the following qualitative characteristics: (a) the release must not produce any slick or other visible evidence of oil or grease, nor contain visible floating oil, grease, scum, litter or other objectionable matter; and (b) the release must not produce any plume or other visible evidence of the release of suspended solids or contain other contaminants in concentrations, which adversely effects the values of the receiving environment.

SCHEDULE C Table 1

**Quality Characteristic Limits for WP1 (Clean Water Holding Pond)
and WP2 / WP3 (Mine Water Management System)**

Quality Characteristics	Unit	Release Limit	Limit Type
Suspended Solids (system as it applies at 1 Jan 2004 – overflow caused by wet weather during first flush (within 12 hours of the commencement of release)	mg/L	150 (for WP2 & WP3)	Maximum
Overflow post 12 hours of the commencement of the release		50	

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Suspended Solids – (post any modification and relocation of mine water management structures), for any release, at all times	mg/L	50	Maximum
Suspended Solids – draw down for retention volume recovery in MWMS; and At all times for WP1	mg/L	50	Maximum
pH	pH units	6.5 – 9.0	Range
Electrical Conductivity – WP2/WP3 only	µS/cm	1700	[80th Percentile]
Electrical Conductivity – WP2/WP3 only	µS/cm	2000	Maximum
Total organic carbon	mg/L	20	Maximum
Aluminium (Total)	mg/L	2	Maximum
Dissolved Oxygen	mg/L	Not less than 4	Minimum
Dioxins and furans (ng TEQ/kg) in sediment	(ng TEQ/kg) in sediment	10	Maximum
Total Nitrogen as N	mg/L	5	Maximum
PO ₄ as P	mg/L	0.2	Maximum
NH ₄ as N	mg/L	1	Maximum
Total oils and grease	mg/L	10 ¹	Maximum
Polynuclear Aromatic Hydrocarbons	µg/L	3.0	Maximum
Phenolic Compounds	µg/L	50.0	Maximum
Total Arsenic	µg/L	50.0	Maximum
Lead (filtered 45 µm)	µg/L	5.0	Maximum
Copper (filtered 45 µm)	µg/L	5.0	Maximum
Total Mercury	µg/L	0.1	Maximum
Total Zinc	µg/L	500	Maximum

Note 1: Elevated levels from the presence of naturally occurring organic matter have been recorded in the past. If levels in excess of 10mg/L are recorded the holder of this authority is required to undertake TPH analysis to determine whether the result is from oil and grease, or natural material.

C14	Water Management Plan A Water Management Plan must be developed and implemented addressing water management issues on the mining lease. <i>Note: The Water Management Plan may be implemented through the Plan of Operations.</i>
C15	The Water Management Plan must address methods to: (a) ensure protection of the environmental values of the receiving waters (including groundwater) downstream of the activity as it relates to the activity; (b) incorporate a risk management approach to how changing levels of floods, drought and

	water quality risks should be addressed; (c) manage recycling; (d) manage stormwater discharge; (e) minimisation of ammonia and total nitrogen release to the environment via Clean Water Holding Pond, the Mine Water Management System and any final voids; (f) maintain a system for managing spills of substances potentially harmful to the environment, such as oils, other hydrocarbons and chemicals and to avoid or minimise the release of the substances to the receiving environment via the water management system; (g) ensure separation of clean water from undisturbed areas and water from disturbed areas; (h) manage site water quality and quantity during the period of the plan of operations and include a site water balance; (i) minimise the potential for soil erosion, soil contamination and acid rock drainage and implement sediment control measures, including sediment dams, to minimise sediment release to the ponds, particularly with regard to first flush flows following rainfall; (j) management of acid generating and potential acid generating material to minimise likelihood of acid generation as far as practicable and manage any runoff and seepage; (k) provide details of operational monitoring and monitoring of hydrological processes including associated performance indicators; and (l) review of sediment retention capacity of the pond system as part of programmed pond relocation for the purpose of augmenting sediment holding capacity and decreasing likelihood of releases.
C16	The holder of this environmental authority must take all reasonable and practicable measures to maximise the recycling or reuse of impounded waters on the licensed place.
C17	Ground waters Groundwater quality in the aquifers will be monitored on a quarterly basis, where water is detected, at points of compliance being not more than within 50 metres from the MRA, mining pit, processing plant or waste water storage structures.
C18	Groundwater quality in the aquifers must not exceed the contaminant limits specified in Schedule C - Table 2 at any point of compliance, being not more than 50 metres from the MRA, mining pit, processing plant or waste water storage structure.
C19	The baseline value for condition (C16) is to be determined from monitoring of the quality of the aquifers, undertaken in areas unaffected by the MRA, Mine Pit, processing plant or waste water storage structures, for example monitoring conducted prior to construction or monitoring of an up-gradient location.

SCHEDULE C Table 2

Groundwater contaminant limits and levels

Quality Characteristic	Units	Contaminant limits and groundwater level (see Note)
Al	mg/L	Baseline Value + 20%
As	mg/L	Baseline Value + 20%
Cd	mg/L	Baseline Value + 20%
Cu	mg/L	Baseline Value + 20%
Fe	mg/L	Baseline Value + 20%
Hg	mg/L	Baseline Value + 20%
Pb	mg/L	Baseline Value + 20%
Zn	mg/L	Baseline Value + 20%
Nitrate as N	mg/L	Baseline Value + 20%
Nitrite as N	mg/L	Baseline Value + 20%
Ammonia as N	mg/L	Baseline Value + 20%
Total Nitrogen as N	mg/L	Baseline Value + 20%
Total Organic Carbon	mg/L	Baseline Value + 20%
Chemical Oxygen Demand	mg/L	Baseline Value + 20%
Dioxins and furans	ng TEQ/L	Baseline Value + 20%
Poly Aromatic Hydrocarbons	µg/L	Baseline Value + 20%
TDS	mg/L	Baseline Value + 20%
EC	µS/cm	Baseline Value + 20%
pH	unit	Baseline Value $\pm$ 1.0

Note: Baseline value + 20% means for Measured Groundwater quality, arithmetic means are not to vary above the reference baseline average by more than 20% and measured groundwater maximum values are not to exceed the reference baseline maximum by more than 20%; or

Apart from TDS, EC and dioxin and furans, the ANZECC 2000 Water Quality value (95% protection for freshwater), whichever is the higher; or for dioxins and furans 0.000014 ng TEQ (WHO)/L whichever is the higher.

Baseline value $\pm$ 1.0 for pH, the corresponding variation allowed is 1.0 pH unit above and below average and maximum values.

C20

Pond conditions

All ponds used for the storage or treatment of contaminants, sewage or wastes, at or on the authorised place must be constructed, installed and maintained:

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	(a) so as to ensure the stability of the ponds' construction; (b) in the case of the ponds containing contaminants that may cause environmental harm, so as to minimise the likelihood of any release of such contaminants through the bed or banks of the pond to any waters (including ground water); and (c) so as to ensure ponds designed for the containment of sediment in mined areas are constructed in accordance with good engineering practice.
C21	Suitable banks and/or diversion drains must be installed and maintained to exclude uncontaminated storm water runoff from entering any ponds containing contaminants that may cause environmental harm.
C22	Stream sediments potentially affected by releases of contaminants from the activity must not exceed: (a) the contaminant trigger levels defined in Schedule C -Table 3, or alternately, if developed, local criteria derived by the relevant process under the Australian & New Zealand Environment & Conservation Council's "Australian Water Quality Guidelines for Fresh and Marine Waters", December 2000 (or more recent updates to this document) whichever is the higher; and (b) a dioxin and furan concentration of 10 ngTEQ/kg.

SCHEDULE C Table 3

Receiving stream sediment contaminant trigger levels

Parameter	Units	Contaminant trigger levels*
Total Arsenic	mg/kg	20
Total Lead	mg/kg	50
Total Mercury	mg/kg	0.15
Total Zinc	mg/kg	200
Total Chromium	mg/kg	80

* Interim sediment quality guidelines low trigger value in mg/kg dry wt based on the less than 63 micron size fraction.

Agency interest: Stormwater Management

Condition number	Condition
D1	Erosion and sediment control All reasonable and practicable erosion protection measures and sediment control measures to be implemented and maintained to minimise erosion and the release of sediment.
D2	Erosion protection measures and sediment controls must be provided and maintained to effectively minimise any likelihood of erosion and release of sediments from the licensed place and be maintained during site clearing, construction, mining operations and rehabilitation.
D3	Erosion control and sediment control structures must be maintained at all times and repaired or

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	replaced as soon as practicable as required following significant rainfall events.
D4	In the event that a release from any dam spillway is necessary, the release must be managed in such a manner that prevents or minimises erosion of any watercourse or areas affected or potentially affected by the release.
D5	Spillage control Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillage must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any external storm water drainage system, roadside gutter or waters. To remove any doubt this condition does not apply to hosing, sweeping, etc of areas and oily materials that drain to an oily-water management system.
D6	Storage of chemicals and fuels Any liquids (or their containers) stored on-site that may cause environmental harm, including all chemicals, oils, fuels and drums must be stored in, or serviced by, an effective on-site containment system (including base and walls) that is impervious to the materials stored or otherwise managed to prevent any release of liquids to stormwater drains, waters and land. Storage tank facilities must be sized to comply with AS 1940-2004, The Storage and Handling of Flammable and Combustible Liquid and for stored materials not subject to that standard, the following: (a) 110% of the tank's volume if a single tank storage; (b) 100% of the largest storage tank plus 10% of the second largest tank if a multiple tank storage; or (c) at least 25% of the maximum design storage volume if a drum storage.
D7	All containment systems must be designed to minimise rainfall collection to the greatest extent practicable. All containment systems must be constructed of materials that are impervious to the materials stored and maintained to be kept free of gaps and cracks.
D8	Prior to any release, any storm water captured within the containment system must be free from contaminants or wastes that may cause environmental harm.
D9	Washing, degreasing, servicing or other maintenance of vehicles, plant, or other equipment must not occur on the licensed place in any area where resulting contaminants will or may be released to any external storm water drain, land or waters except as provided for in Schedule C.
Agency interest: Land	
Condition number	Condition
E1	Release of contaminated water to land The only wastewaters permitted to be released to land are the following: (a) treated sewage effluents;

	(b) contaminated runoff/seepage from in-pit disposal areas and MRA being re-circulated back into the landfills or in accordance with condition G25; (c) settled uncontaminated mine pit water and storm water runoff used for dust suppression and irrigation purposes. <i>Note: This condition does not apply to the co-disposal of stripped sour water with processed shale authorised to be landfilled under this authority.</i>
E2	Sewage treatment When required, the treated wastewater from the sewage treatment plant may be used to irrigate defined areas described as gardens and lawns within the confines of the Plant Site or for dust suppression, industrial reuse or evaporated. Sewage effluent from sewage treatment facilities must not be directly or indirectly released from the sewage treatment plant to any waters, stormwater drain or drainage line.
E3	Quantity of contaminated water released to land The rate of application of water from the sewage treatment plant to gardens and lawns must not exceed the sustainable capacity of the land to assimilate the effluent.
E4	Quality of contaminated water released to land The water from the sewage treatment plant released to land must comply with each of the release limits specified in Schedule E Table 1 for each quality characteristic.

SCHEDULE E Table 1

Release Quality Characteristic Limits

Quality Characteristics	Unit	Release Limit	Limit Type
Biochemical Oxygen Demand	mg/L	20 (see Note 2)	Maximum
Suspended Solids	mg/L	30 (see Note 2)	Maximum
E-coli	organisms/100mL	200	Maximum
		10 (see Note 1)	Maximum
pH	pH units	6 – 9	Range

Note 1: The more stringent limit only applies to advanced disinfected effluent irrigated in via micro-sprays, drippers or subsurface irrigation where the wetted area is less than 20 metres from roads and boundaries, as permitted in accordance with the separation distances mentioned in condition E7.

Note 2: The BOD limit and associated monitoring BOD requirements only apply if a laboratory with a quality assurance program (Gladstone Regional Council) for the analysis is available within a reasonable local proximity, commensurate with available transport and achieving compliance with the maximum sample holding times.

E5	An effluent treatment system or mechanism must be installed and operated to ensure adequate disinfection of the effluent in compliance with condition (E4). The disinfection system may include, but is not limited to chlorination, UV treatment or ozonation.
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E6	Treated settled storm water released to land must be sourced from ponds that are subject to monthly water quality testing and having oil and grease concentrations less than 10 mg/L and suspended solids concentrations less than 50 mg/L. <i>Note: Treated settled storm water with suspended solids greater than 50 mg/L may be used provided that dioxin and furan concentrations in the suspended solids are less than 10 ng TEQ/kg.</i>
E7	When conditions prevent the irrigation of treated effluent, alternative measures must be taken to store or use the treated effluent.
E8	The irrigation and reuse on land of treated wastewater and stormwater to land, taken as from the edge of the wetted area, must not be carried out (a) within 20 metres of any boundary of the mining lease, public road or stormwater drain, except in the case of advanced disinfected effluent applied by either small drip irrigation, subsurface irrigation or small surface sprays with a spray plume not exceeding a diameter of 1.0 m or 0.3 m in height in which case the separation distance is reduced to 2 metres; (b) in a manner likely to cause effluent runoff or surface ponding; (c) within 100 metres of any water supply bore; (d) in any manner or quantity that causes spray to drift beyond the boundaries of the mining lease or any runoff of contaminants to any waters or stormwater drain; (e) in any manner or quantity that adversely affects soil, vegetation or groundwater quality; and (f) such as to cause any exceedance of the Environmental Investigation Thresholds listed in Appendix 9 of the <i>Guidelines for Assessment and Management of Contaminated Land in Queensland</i>.
E9	Rehabilitation outcomes The holder of this environmental authority must progressively rehabilitate the site in a manner such that: (a) suitable native species of vegetation are planted and established, comparable in composition, cover and diversity to analogous sites of similar soils and topographical situation; (b) potential for erosion of the site is minimised; (c) the quality of groundwater, storm water, water and seepage released from the site is such that releases of contaminants, as per Tables 3 and 5 Schedule H and oxygen demanding substances, algae, total phosphorous and turbidity, are not likely to cause environmental harm; (d) the residual void and any other water bodies retained after closure (retained water bodies) must provide for a self-sustaining freshwater ecosystem in which the waters, or if stratified, the surface epilimnion, and any overflows downstream at all times meet water quality criteria and conditions in accordance with either: (i) the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i>

	(2000) published by ANZECC, or updated versions of this guideline, based on the criteria for the protection of aquatic ecosystems (at least 95% protection with regard to toxicants), recreational values (at least secondary contact); downstream primary production values, for example stock watering, and the protection of human consumers of aquatic organisms; or (ii) criteria based on any relevant water quality guidelines developed for Queensland Waters or reference conditions in site specific documents developed from the local conditions of existing stream or natural freshwater lake systems in the area unaffected by the mining activity. These criteria must be developed in accordance with methods outlined in the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)</i> published by ANZECC, or updated versions of this guideline, and any relevant water quality guidelines for Queensland Waters. These criteria are to be applied to quality indicators where local background conditions naturally exceed the relevant ANZECC criteria. (e) sediment quality in any residual void and any other retained water bodies meets the lower trigger values mentioned, or alternately if relevant, local values derived under the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)</i> published by ANZECC, or updated versions of this guideline and, in respect of dioxins and furans, a concentration less than 10 ng TEQ/kg; (f) the likelihood of environmental nuisance being caused by release of dust is minimised; (g) the final landform is geotechnically stable and not subject to slumping; (h) any actual and potential acid generating materials in or on the site are either not disturbed, submerged, treated or otherwise placed and encapsulated so as to not be likely to cause acidic runoff, acidic leachate or environmental harm; (i) surface soil and capping material quality is maintained via procedures, and areas of contaminated land remediated, so as to be less than the Environmental Investigation Thresholds listed in Appendix 9 of the <i>Guidelines for the Assessment and Management of Contaminated Land in Queensland</i>, or managed under a site management plan under the <i>Environmental Protection Act 1994</i>, or less than the corresponding concentration at an analogous sites, and the dioxin and furan concentration is be less than 10 ng TEQ/kg; and (j) where these rehabilitation outcomes relate to areas of the site that host deposited waste material such as processed shale ash and co-disposed stripped sour water, the rehabilitation outcomes must be met for the likely timeframes over which the waste materials may release contaminated runoff/seepage or other contaminants which may cause environmental harm. <i>Note: Local reference values for water quality and sediment quality may be established using the Queensland Water Quality Guidelines, including supporting data, or the processes outlined in the Australian & New Zealand Environment & Conservation Council's "Australian Water Quality Guidelines for Fresh and Marine Waters", December 2000, or updates to this document.</i>
E10	To the greatest extent practicable, rehabilitation of disturbed areas must take place progressively as works are staged and new areas of mining are commenced within the licensed place.

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E11	The holder of this environmental authority must implement and keep records of a monitoring program that effectively measures the success of the rehabilitation measures. Remedial action must be taken in respect of any rehabilitation not meeting required outcomes.
E12	Predictions must be made of final void water quality at least five years prior to expected cessation of mining. In the event that predicted water quality will not likely meet all the required rehabilitation outcomes, management action must be undertaken to such an extent that the rehabilitation requirements are complied with, for example modification of the void geometry, partial backfilling and/or contaminated runoff/seepage recovery and treatment.
E13	Rehabilitation is not to be considered complete in an area, excluding those instances to which E9 (i) applies, until each rehabilitation outcome as defined in this environmental authority has been demonstrated as self-sustaining for a continual period of at least five (5) years. For final voids, this must include demonstrated water quality outcomes being complied with for at least five (5) consecutive years.
E14	Rehabilitation landform criteria The post-mining landform must be returned to native vegetation comparable to analogous sites as per Schedule E Table 2.
E15	The holder of this environmental authority must progressively develop and implement a Final Land Use and Rehabilitation Plan to ensure that all areas disturbed by mining activities will be suitably rehabilitated in accordance with Schedule E Table 2. The Plan must address, but is not limited to the following: (a) disturbance type; (b) disturbance area; (c) pre and post mine land descriptions; (d) pre mine and post mine land capability; (e) analogue site(s) identification; (f) a description of rehabilitation management techniques incorporating works, including any remedial works, and monitoring programs and timetables; (g) indicators for success; and (h) keeping of appropriate records of rehabilitation measures implemented including taking of photographs demonstrative of rehabilitation achieved and the preparation of annual rehabilitation progress reports. <i>Note: Progressive Final Land Use and Rehabilitation Plan (excluding post closure care of the solid waste landfill) is to be managed and progressively updated through the Plan of Operations.</i>
E16	Infrastructure All infrastructure, constructed by or for the holder of this environmental authority during the mining/petroleum activities including water storage structures, must be removed from the site prior to mining lease surrender, except where agreed in writing by the post mining land

	owner/holder.
E17	Rehabilitation – Landfill – Mine Reject Area (MRA) Additional rehabilitation and post closure care measures apply for the MRA and mine pit disposal area (in-pit MRA), as mentioned in Schedule G Waste Management.

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SCHEDULE E Table 2 Rehabilitation Landform Criteria

Disturbance type	Area (ha)	Pre-mining Land Description	Pre mine land <capability/ suitability> classification	Post-mining Land Description	Maximum Post mine slopes (%) Maximum / Average	Analogous site identification (where applicable) (see Note 2 re land capability)
Mine Reject Area (Surface Dump)	50	100% Low Grade Forest	20% Class 3 55% Class 4 25% Class 5	100% Native Bushland Ecosystem	20% / 20%	Native forest ecosystem that is consistent with the final cover system specified in G26
Mine In-Pit Reject Area (excluding final void walls)		100% Low Grade Forest	5% Class 4 95% Class 5	100% Native Bushland Ecosystem	10% / 5%	Native forest ecosystem that is consistent with the final cover system specified in G26
Settlements Ponds	5	50% Grazing 50% Low Grade Forest	70% Class 3 30% Class 4	Retain - Industrial use* or native freshwater wetlands & stock water use If removed - 100% Native Ecosystem	10% / 5%	Analogous native forest and wetland sites
Clean Water Holding Ponds	3				10% / 5%	
Sediment Dams	4	100% Low Grade Forest	50% Class 3 50% Class 4	Retain - Industrial use* or native freshwater wetlands & stock water use If removed - 100% Native Ecosystem	10% / 5%	Analogous native forest and wetland sites
Detention Ponds	4	100% Low Grade Forest	50% Class 3 50% Class 4	Retained - Stock water use	10% / 5%	Not Applicable
Roads	11 (Forest Rd) 4 (Haul & Plant Rds)	100% Low Grade Forest	50% Class 3 50% Class 4 Various Cl. 3 - 5	Retained - Industrial use* and or public roads If removed - 100% Native Bushland Ecosystem	10% / 5%	Analogous native forest site
Plant Site	15	100% Grazing	100% Class 3	Retain - Industrial use* If removed - 100% Native Bushland Ecosystem	10% / 3%	Analogous native forest site
Infrastructure	15	100% Grazing	100% Class 3	Retain - Industrial use* If removed - 100% Native Bushland Ecosystem	10% / 3%	Analogous native forest site
Ore Stockpile area	2	100% Grazing	100% Class 3	Retain - Industrial use* If removed - 100% Native Bushland Ecosystem	10% / 3%	Analogous native grassland site

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Fuel and Storage areas	4	100% Grazing	100% Class 3	Retain - Industrial use*		10% / 3%	Analogous native forest site
				If removed - 100% Native Bushland Ecosystem			
Sewage disposal area	2	100% Grazing	100% Class 3	Retain - Industrial use*		10% / 3%	Analogous native forest site
				If removed - 100% Native Bushland Ecosystem			
Exploration Tracks and pads	1	100% Low Grade Forest	50% Class 3 50% Class 4	Retain - Industrial use*		10% / 5%	Analogous native forest site
				If removed - 100% Native Bushland Ecosystem			
Void and Wetlands	60	100% Low Grade Forest	50% Class 3 50% Class 4	Void perimeter - 100% Freshwater wetlands		30% / 20%	Analogous native wetland site
				Void Excavation water body - Self Sustaining Freshwater wetland		30% / 20%	

* Note 1: It is noted that, at time of finalising rehabilitation, some areas of ML 80003 may be used for subsequent industrial projects. Two options are therefore given, either to retain desired infrastructure and rehabilitate to suit the planned industrial use or to be rehabilitated to the alternate stated native land use.
Note 2: Where rehabilitated to the alternate stated native land use, the land capability is to be restored, to no worse than the pre-mining capability/suitability classifications.

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Agency interest: Noise Management																					
Condition number	Condition																				
F1	In the event of a complaint about noise at a noise sensitive place or commercial place that constitutes unreasonable intrusive noise (excluding blasting noise) being made to the administering authority, that is not based on frivolous or vexatious grounds or on a mistaken belief, then the emission of noise from the licensed place must not result in levels greater than those specified in Schedule F Table 1.																				
SCHEDULE F Table 1 Noise Limits																					
<table border="1"> <thead> <tr> <th colspan="2">NOISE LIMITS AT A NOISE SENSITIVE PLACE</th></tr> <tr> <th>Period</th><th>Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level L_{Amax adj, T}</th></tr> </thead> <tbody> <tr> <td>7 am - 6 pm</td><td>Background noise level plus 5 dB(A)</td></tr> <tr> <td>6 pm - 10 pm</td><td>Background noise level plus 5 dB(A)</td></tr> <tr> <td>10 pm - 7 am</td><td>Background noise level plus 3 dB(A)</td></tr> </tbody> </table> <table border="1"> <thead> <tr> <th colspan="2">NOISE LIMITS AT A COMMERCIAL PLACE</th></tr> <tr> <th>Period</th><th>Noise Level at a Commercial Place measured as the Adjusted Maximum Sound Pressure Level L_{Amax adj, T}</th></tr> </thead> <tbody> <tr> <td>7 am - 6 pm</td><td>Background noise level plus 10 dB(A)</td></tr> <tr> <td>6 pm - 10 pm</td><td>Background noise level plus 10 dB(A)</td></tr> <tr> <td>10 pm - 7 am</td><td>Background noise level plus 8 dB(A)</td></tr> </tbody> </table>		NOISE LIMITS AT A NOISE SENSITIVE PLACE		Period	Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level L_{Amax adj, T}	7 am - 6 pm	Background noise level plus 5 dB(A)	6 pm - 10 pm	Background noise level plus 5 dB(A)	10 pm - 7 am	Background noise level plus 3 dB(A)	NOISE LIMITS AT A COMMERCIAL PLACE		Period	Noise Level at a Commercial Place measured as the Adjusted Maximum Sound Pressure Level L_{Amax adj, T}	7 am - 6 pm	Background noise level plus 10 dB(A)	6 pm - 10 pm	Background noise level plus 10 dB(A)	10 pm - 7 am	Background noise level plus 8 dB(A)
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<i>Note: Background noise level is taken to be not less than 30 dB(A). In the event that measured background noise level is higher than 30 dB(A), then that higher value is to be used.</i>																					
F2	Emergency siren Testing and use, for planned emergency exercises, of the premises' emergency siren system is permitted to be performed between 9am and 5pm Monday to Friday. For planned exercises, potentially affected neighbours are to be notified at least 48 hours prior to testing.																				
F3	Boiler blow down Boiler steam blow must only occur at times when it is not likely to cause an environmental nuisance.																				
F4	Low frequency noise Notwithstanding condition F1 and the limits mentioned in Schedule F Table 1, emission of any noise below 200 Hz must not cause an environmental nuisance.																				
F5	Blasting Blasting must be carried out in a proper manner by a competent person in accordance with best practice environmental management to minimise the likelihood of any adverse effects being																				

	caused by air blast overpressure and/or ground borne vibrations at any noise sensitive places and commercial places and on people living in and/or using the surrounding area.
F6	Noise from blasting operations must not exceed an air blast overpressure level, when measured at or as close as reasonably practical to any noise sensitive place or commercial place, of 115 dB (linear peak) for nine (9) out of any ten (10) consecutive blasts initiate, nor 120 dB (linear peak) at any time.
F7	Ground-borne vibration peak particle velocity caused by blasting operations, when measured at or as close as reasonably practical to any noise sensitive place or commercial place, must not exceed for nine (9) out of any ten (10) consecutive blasts initiated more than 5 mm per second, nor 10 mm per second at any time.
F8	Excluding emergency circumstances, blasting must only occur during the hours of 9am to 6pm Monday to Friday (excluding any public holidays).
Agency interest: Waste Management	
Condition number	Condition
G1	Waste handling and management The holder of this environmental authority must not: (a) allow waste to burn or be burned at or on the licensed place, other than trees and timber from land clearing and other waste as permitted under this environmental authority; nor (b) remove waste from the licensed place and burn such waste elsewhere other than by a licensed incineration facility.
G2	Waste generated in the carrying out the mining/petroleum activity must be stored, handled and transferred in a proper and efficient manner. Waste must not be released to the environment, stored, transferred or disposed contrary to any condition of this authority.
G3	Except as otherwise provided by the conditions of this environmental authority, all disposal of waste generated in carrying out the authority must be to a proper and appropriate facility that accepts that waste unless otherwise approved in writing by the administering authority. Regulated waste, if removed from the site, must only be reprocessed, recycled, stored, incinerated or disposed at a licensed regulated waste facility.
G4	The holder of this environmental authority must implement a Waste and By-Products Management Plan that addresses at least the following matters: (a) the types and amounts of waste generated by the activity; (b) how the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each of the waste management practices mentioned in the waste management hierarchy (section 10 of the <i>Environmental Protections (Waste Management) Policy 2000</i>); (c) segregation of solid waste types and materials including inert overburden, waste with acid

	generating potential, processed shale ash to ensure appropriate placement to avoid oxidation and to prevent use of processed shale ash and any other contaminated materials as cover material; (d) segregation and collection of contaminated runoff/seepage from processed shale disposed to the MRA and/or covering of such processed shale to minimise likelihood of contaminated runoff/seepage from this source being released to the Clean Water Holding Pond, Mine Water Management System or waters (except as provided by condition G25); (e) avoidance of the generation of contaminated runoff/seepage from processed shale disposed to the mine pit and/or covering of such processed shale to minimise likelihood of contaminated runoff/seepage from this source being released to the Clean Water Holding Pond, Mine Water Management System or waters (except as provided by condition G25); (f) procedures to minimise the potential for generation of dust from processed shale (including during handling, moistening, loading, transport, unloading, covering, stockpiling, driving over the material and storage); (g) monitoring to ensure the effectiveness of dust management measures, procedures for identifying and implementing opportunities to improve the waste management practices employed; (h) procedures for dealing with accidents, spills and other incidents that may impact on the waste management; (i) details of any accredited management system employed, or planned to be employed, referenced to the site's Environmental Management System concerning waste and by-product management; (j) how often the performance of the waste management practices will be assessed (at least annually); and (k) the indicators or other criteria on which the performance of the waste management practices will be assessed. <i>Note: The Waste and By-Products Management Plan may be implemented through incorporation in the Plan of Operations.</i>
G5	On site waste treatment The following materials may be treated on site: (a) sour water; and (b) sewage in the sewage treatment plant.
G6	Contaminated soil, oil slops, oil sludges (including interceptor sludges) and sediments, oil scale, bottoms oil, woody biomass, wood waste, lignin and activated carbon, where generated on site, may be recycled through the shale processor, subject to such combustion not significantly contributing to the production of dioxins and furans in solid waste.
G7	Primary treated sour water must not be used for quenching and moistening processed shale if such practice significantly increases the concentration of dioxins and furans in processed shale.

G8	Dioxin and Furan contaminated waste The activity must be undertaken in accordance with best practice environmental management, to reduce or eliminate dioxin and furan production and in accordance with the waste management hierarchy and principles of the <i>Environmental Protection (Waste Management) Policy 2000</i>.
G9	During periods of operation, and for the purpose of complying with condition G8, the holder of this environmental authority must develop and implement a dioxin and furan reduction and elimination plan including but not limited to: (a) identification of plant processes which give rise to the formation and production of dioxin and furans; (b) identification of operational parameters and measures which would result in the reduction, and where feasible, elimination of dioxin and furan generation in plant processes; (c) identification of the mechanisms of dioxin and furan production in these processes; (d) ensuring that any sour water or other waste water used to moisten spent shale is prior treated so as to not increase dioxin and furan content of processed shale ash; (e) measures to substantially reduce or eliminate the production of dioxins and furans, with particular regard to dioxin and furan contamination of processed shale ash, taking into consideration the heterogeneity of processed shale ash and the variability in sampling and analysis; (f) implementation of measures as to reduce, and where feasible, eliminate dioxin and furan production; and (g) quarterly reports detailing the results of the development and implementation of the plan to the administering authority, including reporting the progress of the above steps and the results of monitoring of dioxin and furan production. <i>Note: The plan does not apply to air emissions where those emissions meet the limits specified in Schedule B.</i>
G10	For the purpose of demonstrating compliance with G9, the holder of this environmental authority may operate the plant in accordance with its report of 17 April 2003 titled "<i>Developments in Dioxin and Furan Management – Stuart Oil Shale Project</i>" (or an alternative operating framework that achieves the same dioxin/furan outcomes) <u>and must monitor as often as is necessary to ensure compliance with the 10 ng TEQ/kg requirement but at least quarterly</u> and keep records of dioxin and furan content of processed shale and plant performance criteria potentially relevant to dioxin and furan formation. These results and a summary of the abovementioned plant performance operating criteria are to be submitted to the administering authority quarterly. In the event that processed shale analysis show all results for processed materials and wastes and any material contaminated with processed materials and wastes containing dioxins and furans at concentrations not exceeding 10 ng TEQ/kg for a period of two years and plant operating criteria are not materially changed, then the monitoring and reporting frequency for these requirements may be reduced to annually.
G11	Processed materials and wastes, and any material contaminated with processed materials and

	wastes containing dioxins and furans at concentrations above 10 ng TEQ/kg, must be managed, transferred, transported, stored and disposed in a manner so as to prevent the generation of windblown dust or placement in any position whereby such material could be reasonably be expected to be otherwise released to the environment by the action of air, water or other means. For the purposes of this condition, placement in the landfill and stockpiles of materials used for start-up and shut down procedures from which there is no subsequent release, is not considered to be a release to the environment.
G12	Waste acceptance Only the following waste and materials are permitted to be disposed of on site: (a) processed shale; (b) waste rock, overburden and inter-burden extracted from the mine; (c) potential acid generating material from the mine; (d) waste shale; and (e) other inert material and construction and demolition waste derived from the mining/petroleum activity.
G13	Processed shale and treated stripped sour water must only be disposed of or placed in the mine pit, where that placement is in a competent containment system, and managed according to competent measures that have been designed and certified by a competent person in the design and management of such systems. The design and operation of the system must address, but not be limited to the following: (a) Hydrogeological and geochemical investigations of local conditions to provide high confidence field scale data on the hydrogeological system and geochemical factors that may affect environmental performance of the containment system; (b) protection from uplift pressures; (c) methods to prevent the migration of potential contaminated seepage into groundwater, surface water and final void water. These methods may include the use of natural, low permeability geological sequences or liners or technologies, if practicable and effective in the particular circumstance, such as targeted injection grouting into structures considered by the competent person to be capable of providing hydraulic connectivity between contaminated seepage and groundwater; (d) groundwater monitoring; (e) issues related to further extraction of deeper oil shale resources; (f) material placement and day to day management; (g) minimising hydraulic connectivity between the waste mass and surface or groundwater, including void water; (h) the structure of the final landform so as to facilitate the achievement of rehabilitation criteria; (i) the treatment of nutrients, sulphur compounds and organic contaminants of disposed treated stripped sour water, with treatment benchmarked against biological treatment

	processes, including for chemical oxygen demand reduction and nitrification and de-nitrification; (j) assessment against compliance with the requirements of sections 13 and 14 of the <i>Environmental Protection (Water) Policy 2009</i> and sections 62, 63 and 64 of the <i>Environmental Protection Regulation 2008</i>; (k) contaminated runoff/seepage management (including minimisation and any necessary collection and treatment) so that ground water quality complies with the limits mentioned in Schedule C and the final void and retained water body water quality complies with the outcomes mentioned in Schedule E; (l) closure and post closure care; (m) avoiding any post-mining changes to groundwater levels or off-site yields that adversely affect environmental values or any use of the groundwater resources; (n) minimising likelihood of any acid formation from any actual or potentially acid generating material; and (o) any alternate equivalent environmental protection measures. <i>Note: The competent person shall design the containment system on the basis of full consideration of relevant hydrogeological reports.</i>
G14	At least three (3) months prior to any placement or disposal of any processed shale and treated stripped sour water, the competent person mentioned in condition G13 must in respect of in pit disposal provide in writing to the administering authority: (a) full details of the containment system design measures adopted; (b) full details of the complementary environmental management measures, including material placement, quality assurance measures and monitoring; (c) recommended closure and post closure care; (d) a certificate signed by the competent person certifying that the proposed containment system (incorporating complementary environmental management measures) complies with the requirements to minimise the likelihood of environmental harm and ensure likely compliance with the conditions of this environmental authority; and (e) the grounds, data and calculations that form the basis for that opinion, in particular how prescribed environmental outcomes for groundwater, surface and retained void water quality will be met. <i>Note: Measures must be specified. An approach of conducting further investigation and deciding measures at a later date does not satisfy this requirement and is not considered competent for the purposes of this authority. Where unavoidable for practicable reasons of confirming design assumptions, an approach of carrying out specific tests and applying pre-specified measures in response to test results prior to any placement may be incorporated.</i>
G15	Notwithstanding conditions G13 and G14, processed shale moistened with treated stripped sour water derived from the operation of the technology demonstration plant must not be disposed of or placed in the mine pit. Disposal is to be to the Ex-pit dump.

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G16	Mine Reject Area(s) Deposited exposed high risk waste, namely processed shale, sour water and potentially acid forming waste must be limited to a working face of the MRA and the area of exposure must be minimised to the greatest extent practicable, to minimise dust generation, acid generation and water borne transport of contaminants off the MRA.
G17	Every lift of waste deposited within the MRA must be consolidated by mechanical plant in accordance with competent engineering advice and quality management procedures and testing to create a geotechnically stable landform. Records must be kept of all test results.
G18	Deposited exposed high risk waste, namely processed shale, sour water and potentially acid forming waste, must be covered with earthen or other suitable material or kept in a state that is unlikely to emanate dust as often as necessary to prevent the waste from being released from the MRA.
G19	The earthen material used for the cover must not be characterised as potential acid generating or acid generating, and must not include processed shale or material contaminated by processed shale or primary treated sour water.
G20	Earthen material necessary for the coverage of deposited high-risk waste must be managed and be readily available at the premises to which this environmental authority relates in a sufficient quantity.
G21	The design and quality management system of the MRA must be certified by a competent engineer in the design and management of such structures and be inspected by a competent engineer annually or at any time if alarming, unusual or otherwise unsatisfactory conditions are observed.
G22	For each inspection, the engineer shall assess the condition of the structure and its management to determine the adequacy of the structure and assess the adequacy of the works with respect to geotechnical stability and erosion minimisation and report any adverse findings and any recommendations to the administering authority within 28 days of the inspection. A copy of the report must be kept at the licensed premises.
G23	Contaminated runoff/seepage collection and disposal A liner system or alternative environmental management measure of equivalent effectiveness in the long term must be implemented and maintained to effectively minimise the likelihood of any release of contaminants to groundwater.
G24	Contaminated runoff/seepage from any deposited processed shale must be segregated and collected in a contaminated runoff/seepage collection dam(s) for evaporation, reuse or treatment in the mining or processing/refining activities and not be directly or indirectly released to any surface waters or the bed and banks of any waters or stormwater drain, except in the event of inundation of the active mine pit compromising the contaminated runoff/seepage collection system and the pit water system, when the contaminated runoff/seepage may be managed through the mine water management system to meet water quality criteria set out in Schedule C. Any contaminated seepage impact on groundwater must be minimised so that the groundwater

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	complies with the relevant groundwater quality limits prescribed in Schedule C at the point of compliance. The contaminated runoff/seepage collection dam(s) must have capacity to hold the runoff expected from a five-day multi-day wet event with an annual exceedence probability of once in ten years. Water in the contaminated runoff/seepage collection dam(s) must be used preferentially in the mining or processing/refining activities (e.g. including the use of this water in dust suppression on haul roads or for civil works within the mining area where not likely to adversely affect storm water runoff quality).
G25	When the deposition of waste to each MRA ceases (i.e. the ex-pit MRA and any in-pit MRA), the holder of this environmental authority must install a final cover system over the MRA that on a long-term basis minimises: (a) infiltration of water into the MRA; and (b) the likelihood of any erosion occurring to either the final cover system or the landfilled materials.
G26	The final cover system must include at least: (a) a layer of material of sufficiently low permeability to minimise infiltration; and (b) an upper layer of earthen material that is capable of sustaining native plant growth without compromising the integrity of the low permeability sub-surface layer.
G27	The final cover system for each MRA must be terraced and/or graded and re-vegetated as soon as practicable with suitable species so as to prevent erosion from this source and ponding of water on the final cover system, with maximum overall slope not exceeding 1 vertical to 5 horizontal.
G28	For the purposes of preventing and/or minimising the likelihood of environmental harm being caused as a result of deposition of waste in each MRA, the holder of this environmental authority must, following cessation of deposition of waste in the MRA, conduct post-closure care of the MRA for: (a) a period of 30 years; or (b) such shorter period until it is demonstrated to the administering authority in a competent manner using relevant information that the MRA and surrounding site are geotechnically stable and that no release of waste materials, contaminated runoff/seepage or other contaminants that may cause environmental harm is likely.
G29	The program of post-closure care implemented must be effective in preventing and/or minimising the likelihood of environmental harm being caused or allowed. The program must include measures to: (a) maintain the structural integrity and effectiveness of the final cover system; (b) maintain and operate the contaminated runoff/seepage management system, for example a contaminated runoff/seepage avoidance system; (c) maintain the groundwater monitoring network and monitor quality of groundwater at a frequency sufficient to detect any release of contaminants to groundwater;

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	(d) in the event of material emissions of land fill gases generating offensive odours at an odour sensitive place, land fill gas capture and flaring or re-use measures; and (e) include recommendations and any restrictions for future use, development and activities of/on the land.
G30	A draft site management plan for the post-closure management of hazardous contaminants shall be submitted by the holder of this environmental authority to the administering authority for approval at least six (6) months prior to the cessation of mining/petroleum activities.
G31	All reasonable and practicable fire prevention measures must be implemented, including removal of grass and other materials within a 10m radius of the scrap tyre storage area.
Agency interest: Monitoring and Reporting	
Condition number	Condition
H1	Monitoring of ambient weather conditions A weather station for continuous representative monitoring and recording of wind direction and wind speed will be installed and operated on site.
H2	Monitoring of contaminant releases to the atmosphere and ambient air All determinations of ambient air and contaminant releases to the atmosphere must be made in accordance with methods prescribed in the most recent version of the Department of Environment and Heritage Protection's Air Quality Sampling Manual. If monitoring requirements for specific contaminants are not described in the Department of Environment and Heritage Protection's Air Quality Sampling Manual, monitoring protocols must be in accordance with: (a) for odour, Australian and New Zealand Standard AS/NZS 4323.3:2001, <i>Stationary source emissions - Determination of odour concentration by dynamic olfactometry</i>; and (b) for other contaminants, a method as approved by New South Wales EPA, Victorian EPA or United States EPA.
H3	The holder of this environmental authority must conduct and keep records of a monitoring program of contaminant releases to the atmosphere at the release points, minimum frequency, and for the determinations specified in Schedule H Table 1, as well as contingency monitoring during plant upsets, and which complies with the following: (a) monitoring provisions for the release points listed in Schedule H Table 1 must comply with the Australian Standard AS 4323.1-1995 "Stationary source emissions method 1: Selection of sampling provisions". (b) the following tests must be performed for each required determination specified in Schedule H Table 1: (i) gas velocity, volume and mass flow rate; (ii) temperature and oxygen content; and

	(iii) water vapour concentration (for non-continuous sampling); (c) where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be normal, except for specific purpose samples to be taken during periods of 'upset conditions', 'commissioning', 'start-up' and 'shutdown'; and (d) during the sampling period the following additional information must be gathered: (i) production rate, and (ii) plant operating mode (heating and combustion).
H4	During periods of operation, the holder of this environmental authority must implement a program of ambient air quality monitoring program as set out Schedule H Table 2.

SCHEDULE H Table 1

Required Release Point Determinations

Determination Required	Release Point	Frequency
Sulphur Dioxide, SO ₂ (grams per second)	Plant thermal oxidiser stack, Dryer flue gas stack	Continuously**
Nitrogen Oxides, NO and NO ₂ (grams per second)	Plant thermal oxidiser stack, Dryer flue gas stack	Isokinetic quarterly and continuously**
Hexavalent chromium	Plant thermal oxidiser stack, Dryer flue gas stack	Monthly
Hydrogen chloride (HCl) and Hydrogen Fluoride (HF)	Plant thermal oxidiser stack, Dryer flue gas stack	Monthly
Dioxins and Furans	Plant thermal oxidiser stack, Dryer flue gas stack	Quarterly for a period of 12 months from the date of commissioning of the TD Plant, and then annually provided the release limit is complied with.
Odour Concentration (ou)	Plant thermal oxidiser stack, Dryer flue gas stack	Two days per week*
Particulates (grams per second and mg/Nm ³)	Plant thermal oxidiser stack, Dryer flue gas stack	Iso-kinetic quarterly and continuously**
Benzene	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Formaldehyde	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
PAH as Benzo(a)pyrene equivalent	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Carbon Disulphide (CS ₂)	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Carbonyl Sulphide (COS)	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Thiophene	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Hydrogen Sulphide (H ₂ S)	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Total Reduced Sulphur (TRS)	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*

Total VOCs as n-propane equivalent	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Speciated VOC analysis	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*
Heavy metals including total of lead, cadmium, mercury, chromium, arsenic, nickel and beryllium	Plant thermal oxidiser stack, Dryer flue gas stack	monthly*

*Note: * means during weeks or months (or part thereof where practicable subject to laboratory or stack testing contractor availability) in which the plant is run.*

*** continuous means the instrument monitors and records continuously, except during calibration and servicing.*

SCHEDULE H Table 2

Monitoring of Ambient Ground Level Concentrations

Determination Required	Sampling Location	Frequency
Sulphur Dioxide, SO ₂	Monitoring conducted at the Targinnie monitoring station.	Continuous – as maintained and operated by Queensland Health Air Science
Nitrogen Oxides, NO and NO ₂		
Particulates PM ₁₀		

H5	Emission Control Plant Monitoring and keeping of records of parameters that indicate effective operation of the emission control equipment must be undertaken, for example, plant thermal oxidiser operation. Records must be marked to show the true calendar date and time of day. Where monitoring indicates impaired operational performance likely to cause non-compliance, standby systems or corrective measures are to operate or else safe shut down of the processing plant must be carried out.
H6	Shale dryer Except during calibration servicing the holder of this authority must continuously record the operating temperature of the dryer and the wind direction whenever the shale dryer is operating.
H7	Sour water The condition of the sour water must be monitored and recorded as often as necessary, but not less than daily, to comply with the requirements of Schedule B.
H8	Monitoring of contaminant releases to waters – Quality The holder of this environmental authority is responsible for the making of determinations and keeping of records of the estimated or measured quantity, and quality characteristics of contaminants released from the points at the frequency and monitoring points specified in Schedule H Table 3.
H9	The holder of this environmental authority is responsible for the making of determinations and

keeping of records of the quality of the contaminants contained within the Clean Water Holding Pond and the Mine Water Management System at the frequency specified in Schedule H Table 3.

SCHEDULE H Table 3
Monitoring of Contaminant Releases to Waters

Quality Characteristic Determination	Release Point/Monitoring Points	Frequency
Suspended Solids	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
pH	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Electrical Conductivity	WP2	Weekly, if any release occurs, monthly*
Dissolved Oxygen	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Nitrogen as N	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Phosphate as N	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Ammonia as N	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Oil and Grease	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Polynuclear Aromatic Hydrocarbons	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Sulphate	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Aluminium	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Aluminium	WP2, WP3	Weekly, if any release occurs, monthly*
Total organic carbon	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Phenolic Compounds	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Copper	WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Copper	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Arsenic	WP2, WP3	Weekly, if any release occurs, monthly
Dissolved Arsenic	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Chromium	WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Chromium	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total lead	WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Lead	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Iron	WP2, WP3	Weekly, if any release occurs, monthly*
Dissolved Manganese	WP2, WP3	Weekly, if any release occurs, monthly*
Total Mercury	WP2, WP3	Weekly, if any release occurs, six monthly*. (see note **)
Dissolved Mercury	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Total Zinc	WP2, WP3	Weekly, if any release occurs, six monthly*. (see note **) *
Dissolved Zinc	WP1, WP2, WP3	Weekly, if any release occurs, monthly*
Hardness as CaCO ₃	Downstream of WP2 & WP3	Weekly, if any release occurs
Dioxins and Furans ng TEQ/kg (in suspended solids or downstream deposited solids***)	WP1, WP2, WP3	Annually immediately following a discharge event

*Note: * Means monitoring weekly during any overflow events. In the period when the Mine Water Management System is not discharging, monthly monitoring must be undertaken of the final pond of the Mine Water Management System and Clean Water Holding Pond as relevant to the release point adjacent to the*

discharge structure, except WP3, which is only monitored if it overflows. Source waters may be monitored for compliance purposes.

*** Means if a result exceeds the release limit, these frequencies shall revert back to weekly and monthly respectively until such time as monitoring water quality is below the release limit.*

****A surface soil scraping containing settled solids sampled immediately downstream of the release point may be used to determine the concentration of dioxins and furans in suspended solids if sufficient mass of solid sample for analytical purposes cannot be obtained from a standard sized water sample. The analysis shall be determined on the <63 micron size fraction and the organic carbon content of the sediment sample also measured.*

H10	Monitoring of available capacity in clean water holding pond The holder of this environmental authority is responsible for determining and keeping records of the available capacity in Clean Water Holding Pond.
H11	Monitoring of contaminant releases to waters - Quantity The holder of this environmental authority is responsible for the making of determinations and keeping of records of the quantity of wastewaters released to waters on every day on which a release occurs, for example via a flow meter.
H12	All determinations of the quality of contaminants released to waters, sewage effluent and other waste waters reused must be made in accordance with methods prescribed in the most recent version of the Department of Environment and Heritage Protection's Water Quality Sampling Manual.
H13	Sewage effluent All effluent released from the treatment plant must be monitored on a monthly basis for the quality characteristics defined in Schedule E – Table 1.
H14	Noise monitoring When requested by the administering authority, noise monitoring and recording must be undertaken within a reasonable and practicable timeframe nominated by the administering authority to investigate any complaint (which is neither frivolous nor vexatious nor based on mistaken belief in the opinion of an authorised officer) of environmental nuisance at any sensitive place, and the results must be notified within 14 days to the administering authority following completion of monitoring.
H15	Noise monitoring must include the following descriptors, characteristics and conditions will be sampled: (a) $L_{Amax, AdjT}$; (b) $L_{A90,T}$ or $L_{A90,T}$; (c) $L_{AN,T}$ (where N equals the statistical levels of 1 and 10); (d) $Max L_{pA,T}$; (e) $L_{Aeq,T}$; (f) the level and frequency of occurrence of impulsive or tonal noise;



	(g) atmospheric conditions including temperature, relative humidity and wind speed and directions; (h) effects due to extraneous factors such as traffic noise; and (i) location, date and time of monitoring.
H16	The method of measurement and reporting of noise levels must comply with the Department of Environment and Heritage Protection's Noise Measurement Manual, third edition, March 2000, or more recent editions or supplements to that document as become available.
H17	The measurement and reporting of noise levels must be undertaken by a person or body possessing appropriate experience and/or qualifications to perform the required measurements.
H18	Records must be kept of all noise monitoring carried out under this environmental authority.
H19	Groundwater monitoring A groundwater monitoring network must be installed for the mine site and landfill sites. The network must: (a) be designed and positioned by a person possessing appropriate qualifications and experience in hydrogeology and groundwater monitoring program design, to be able to competently make recommendations about these matters; (b) include a sufficient number of "bore(s) of compliance" that are located not more than 50metres from potential sources of impact from mining activities; and (c) provide the following: (ii) representative groundwater samples from the aquifer(s); and; (ii) background groundwater quality in hydraulically up-gradient or background bore(s) that have not been affected by any mining activities; and (ii) the quality of groundwater down gradient of any potential source of contamination including groundwater passing the relevant bore(s) of compliance; and (d) be constructed in accordance with the requirements of Australian Standard "AS5667.11:1998 "Water Quality Sampling: Guidance on Sampling Groundwaters"; and (e) be installed and maintained by a suitably trained and experienced person.
H20	Conduct monitoring and keep records of groundwater quality for the relevant bores of compliance for both the aquifer hosted in surface alluvium and the deeper Rundle formation. All determinations of groundwater quality must be: (a) conducted for the water quality characteristics and at the minimum frequency stated in Schedule H - Table 5; (b) taken from sufficient monitoring points and/or wells to obtain representative samples of groundwater both up-gradient and down-gradient of the potential influence; (c) carried out with sufficient regularity and temporal replication to make statistically valid conclusions about the presence or absence of contamination or other impact;

	(d) followed by an assessment of whether or not there has been any statistically significant adverse change when comparing results for monitoring conducted prior to construction or monitoring of an up-gradient location to locations hydraulically down gradient of the potential sources of contamination for each quality characteristic in Schedule H - Table 5.
H21	On any occasion that groundwater monitoring samples are obtained, the holder of this environmental authority must measure and record standing groundwater levels in metres accurate to 0.01 metres. The elevation of the reference point, relative to Australian Height Datum, for use in any groundwater level measurement must be determined to an accuracy of 0.01 metres.
H22	Record of the results of groundwater monitoring must be kept and made available to the administering authority on request.

SCHEDULE H Table 5

Groundwater quality and level monitoring

Quality Characteristic	Units	Monitoring Frequency
Al	mg/L	Quarterly
As	mg/L	Quarterly
Ca	mg/L	Quarterly
Cd	mg/L	Quarterly
Cl	mg/L	Quarterly
Cu	mg/L	Quarterly
F	mg/L	Quarterly
Fe	mg/L	Quarterly
Hg	mg/L	Quarterly
K	mg/L	Quarterly
Mg	mg/L	Quarterly
Mn	mg/L	Quarterly
Na	mg/L	Quarterly
Pb	mg/L	Quarterly
SO ₄	mg/L	Quarterly
Zn	mg/L	Quarterly
HCO ₃	mg/L	Quarterly
CO ₃	mg/L	Quarterly
Nitrate as N	mg/L	Quarterly
Nitrite as N	mg/L	Quarterly
Ammonia as N	mg/L	Quarterly
Total Nitrogen as N	mg/L	Quarterly
Chemical Oxygen Demand	mg/L	Quarterly
Dioxins and furans	ng TEQ/L	Annually

<table><tr><td>Polynuclear Aromatic Hydrocarbons</td><td>µg/L</td><td>Quarterly</td></tr><tr><td>TDS</td><td>mg/L</td><td>Quarterly</td></tr><tr><td>EC</td><td>µS/cm</td><td>Quarterly</td></tr><tr><td>PH</td><td>unit</td><td>Quarterly</td></tr><tr><td>Standing water level</td><td>m</td><td>Quarterly</td></tr></table>			Polynuclear Aromatic Hydrocarbons	µg/L	Quarterly	TDS	mg/L	Quarterly	EC	µS/cm	Quarterly	PH	unit	Quarterly	Standing water level	m	Quarterly
Polynuclear Aromatic Hydrocarbons	µg/L	Quarterly															
TDS	mg/L	Quarterly															
EC	µS/cm	Quarterly															
PH	unit	Quarterly															
Standing water level	m	Quarterly															
H23	For the purpose of checking compliance with the stream sediment quality outcomes prescribed in Schedule C, the bed of the receiving waters, potentially affected by the release of process water and storm water contaminated by the activities must be monitored at the locations and frequencies defined in Schedule H Table 6.																
SCHEDULE H Table 6 Receiving stream sediment monitoring locations and frequency																	
<table><tr><th>Monitoring point</th><th>Parameter</th><th>Monitoring frequency</th></tr><tr><td>Gully/Gullies via which the mine water management system discharges e.g. Dam A on Gully C</td><td>total arsenic, total lead , total copper, total mercury, total Zinc, total chromium, dioxins and furans (on < 63 micron size fraction)</td><td>Annually</td></tr></table>			Monitoring point	Parameter	Monitoring frequency	Gully/Gullies via which the mine water management system discharges e.g. Dam A on Gully C	total arsenic, total lead , total copper, total mercury, total Zinc, total chromium, dioxins and furans (on < 63 micron size fraction)	Annually									
Monitoring point	Parameter	Monitoring frequency															
Gully/Gullies via which the mine water management system discharges e.g. Dam A on Gully C	total arsenic, total lead , total copper, total mercury, total Zinc, total chromium, dioxins and furans (on < 63 micron size fraction)	Annually															
H24	Blast monitoring Monitoring and recording of air blast overpressure levels and ground vibration must be undertaken for the initial 15 blasts at a location between the blast and the nearest noise sensitive place. This blast monitoring may only cease afterwards if the nature of the blast does not differ materially from those initially monitored and the material is consistent with previous blasts, and the blast is not materially closer to sensitive receptors.																
H25	Monitoring and recording of air blast overpressure levels must also be undertaken at any other location(s) for a period advised in writing by the administering authority to investigate any relevant complaint not considered by the administering authority to be frivolous, vexatious or based on mistaken belief. In conjunction with the monitoring, records must be kept of at least the following descriptors, characteristics and conditions: (a) maximum instantaneous charge (MIC); (b) location of the blast within the site (including bench level); (c) air blast overpressure level (dB Linear Peak); (d) peak particle velocity (mms ⁻¹); (e) location, date and time of recording; (f) measurement instrumentation and procedure; (g) meteorological conditions for blast monitoring (including temperature, relative humidity, temperature gradient, cloud cover, wind speed and direction); and (h) distance/s from blast site to potentially noise-affected building/s or structure/s.																

H26	Where access to a potentially noise-affected property for monitoring purposes is not practicable or permitted, then the measurement may be undertaken at the appropriate property boundary.
H27	Outdoor measurement of air blast overpressure Measurement of air blast overpressure must be: (a) at an appropriate location which is exposed to the blasting; and (b) at least 4 metres from any noise-affected building or structure; and (c) at a position between 1.2 metres and 1.5 metres above the ground.
H28	Noise from blasting must be measured using noise measurement equipment with a lower limiting frequency of 2 Hz (- 3 dB response point of the measurement system) and a detector onset time of not greater than 100 microseconds as assessed in accordance with AS IEC 61672.2 and AS IEC 61672.1 2004.
H29	Outdoor measurement of ground vibration The ground-borne vibration transducer (or array) must be attached to a mass of at least thirty (30) kg to ensure good coupling with the ground, where the blast site and the measurement site cannot be shown to be on the same underlying strata. The mass shall be buried so that its uppermost surface is at the same level as the ground surface.
H30	The ground-borne vibration transducer (or array) must be placed at a distance of at least the longest dimension of the foundations of a noise-affected building or structure away from such building or structure and be between that building or structure and the site of the blasting.
H31	Vibration instrumentation must be capable of measurement over the range 0.1 mms^{-1} to 300 mms^{-1} with an accuracy within 5 % and have a frequency response flat to within 5 % over the frequency range of 4.5 Hz to 250 Hz.
H32	The holder of this environmental authority must implement a Receiving Environment Monitoring Program (REMP) in accordance with design the National Water Quality Management Strategy (ANZECC 2000) "Australian Guidelines for Water Quality Monitoring and Reporting 2000", to monitor quality indicators of the receiving environment, relevant to the release of contaminants, to effectively determine whether environmental values are being protected in the receiving environment. Receiving environment" for the purpose of the Receiving Environment Monitoring Program includes all surface waters downstream of the mining activity. For the purposes of this condition, environmental values are considered to be harmed and not protected if the relevant water quality guidelines for the indicators for environmental values prescribed in the <i>Environmental Protection (Water) Policy 2009</i> are not being met, including any water quality objectives adopted pursuant to Section 10 of that Policy. <i>Note: The REMP may be managed through successive Plans of Operation.</i>
H33	Involvement in regional monitoring studies constitutes compliance As an alternative (in whole or part) to carrying out the Receiving Environment Monitoring Program specified in this schedule, the holder of this environmental authority may become and remain a

	"participating member" in any relevant regional water quality and ecosystem health monitoring study/studies that monitor potential impacts of the activity. To the extent that the regional water quality and ecosystem health monitoring study/studies effectively monitor the potential impacts from the activities, the holder of this environmental authority may rely on those studies for monitoring of those potential impacts.
H34	The holder of this environmental authority is deemed by the administering authority to be a "participating member" in regional studies in the following situations. The holder: (a) is a 'contributing member', to the regional studies of water quality and ecosystem health; (b) is identified as a 'contributing member' in a written statement to the administering authority from the environmental authority carrying out the regional studies; and (c) continues to be a 'contributing member', of such regional studies. <i>Note: "Contributing member" means that the holder of this environmental authority contributes towards the reasonable cost of environmental monitoring studies undertaken relevant to potential impacts of the environmentally relevant activities whereby the amount is agreed to between the holder of this environmental authority and the authority carrying out the regional studies.</i>
H35	Leak detection and repair program During periods of operation, including when hydrocarbons are stored, the holder of this environmental authority must conduct a leak detection and repair program for all pump and compressor seals, valves, and pipe flanges.
H36	The leak detection and repair program does not apply to: (a) pumps and compressors fitted with double mechanical seals; (b) any item on a line with a nominal diameter less than 30 mm; (c) any item which is not accessible for reasons of worker safety; (d) any item handling a liquid with a vapour pressure less than 0.4 kPa; and (e) any item handling gases containing more than 90 % methane and or hydrogen.
H37	The leak detection and repair program shall be performed at the following intervals: (a) valves not less than every 3 months for all active valves; (b) pump seals not less than every 3 months; (c) pipe flanges all flanges which are opened for maintenance (tests are to be performed within 14 days of the recommencement of operations or at operating pressure and ambient temperature prior to start-up); and (d) compressor seals not less than every 3 months.
H38	For the purposes of the leak detection and repair program a leak is defined as the discharge of a visible mist, or a Total Organic Carbon (TOC) concentration measured as close to the source as practicable which exceeds 10,000 ppm.

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H39	Notwithstanding any other condition of this schedule any active valves, pump and compressor seals, which do not exceed the leak definition stated in condition H38 for two consecutive inspections may thereafter be inspected annually.
H40	Should an active valve, pump or compressor seal be found to leak at a subsequent test the initial sampling frequency requirements stated in condition H37 must recommence.
H41	Leak detection monitoring shall be performed by slowly traversing the potential leak surface with the probe of the detector. If a leak is suspected then the probe must be moved backward and forward over the site to determine the peak concentration and then held stationary for not less than 30 seconds.
H42	The leak detector used must be calibrated on each day of use and must comply with each of the following requirements: (a) the instrument must be capable of measuring the leak concentration; (b) the calibration precision must be not greater than 10%; (c) the instrument response time must be less than 30 seconds; (d) the scale sensitivity must be at least 10% of the leak definition; (e) the instrument must be equipped with a pump which has a sample flow rate between 0.5 and 3.0 litres per minute; and (f) the instrument must be intrinsically safe.
H43	Upon detection of a leak: (a) the leaking component must be identified by a numbered weatherproof tag; (b) the person operating the detection equipment shall record the tag number, the date, and sufficient information to identify the leak; (c) the leak shall be repaired within 7 days of detection if repair can be effected without shutting down the process unit served; (d) the leak shall be minimised within 7 days and repaired at the next process unit shutdown or turnaround if repair cannot be effected without shutting down the unit process; and (e) the numbered tag shall not be removed until the leaking component passes two consecutive quarterly inspections.
H44	The holder may conduct an alternative process-specific Leak Detection and Repair Program with equivalent performance regarding leak detection and repair.
H45	Dust deposition For the purposes of checking compliance with conditions B10 and B11, the holder of this environmental authority must implement a particulate monitoring program in accordance with the requirements of Schedule H - Table 7 and keep records of the monitoring results.
H46	Samples taken for the particulate monitoring program must be collected and analysed in accordance with the requirements of the Department of Environment and Heritage Protection's "Air

	Quality Sampling Manual", first edition, November 1997, or more recent editions or supplements to that document as published by the Department of Environment and Heritage Protection from time to time.
H47	All determinations of particulate monitoring must be performed by a person or body possessing appropriate experience or qualifications to perform the required determinations.

SCHEDULE H Table 7
Monitoring of Dust and Particulate Emissions

Air Quality Determination	Monitoring Points	Frequency
Ambient particulate matter (insoluble analysis and particulate matter deposition rate in milligrams/square metre/day)	Four locations sited at approximate even spacing around the licensed place in the proximity of dust sensitive places that are potentially affected by release of dust and particulate matter	Monthly*
	At or near any other dust sensitive place, to investigate any complaint alleging dust nuisance that is reasonably likely to have emanated from the licensed place, upon receipt of request from the administering authority to carry out such monitoring.	over a period of at least three consecutive monthly periods
24 hour average concentration of particulate matter with an aerodynamic diameter less than 10 microns (μm) (PM_{10})	Downwind of the licensed place to investigate any complaint alleging that an unhealthy condition is caused by dust and particulate matter that is reasonably likely to have emanated from the licensed place, upon receipt of request from the administering authority to carry out such monitoring.	A single program to determine the 24 hour average concentrations, based on a minimum of 4 representative samples obtained over a one month period
24 hour average concentration of particulate matter with an aerodynamic diameter less than 2.5 microns (μm) ($\text{PM}_{2.5}$)	Downwind of the licensed place to investigate any complaint alleging that an unhealthy condition is caused by dust and particulate matter that is reasonably likely to have emanated from the licensed place, upon receipt of request from the administering authority to carry out such monitoring.	A single program to determine the 24 hour average concentrations, based on a minimum of 4 representative samples obtained over a one month period.

END OF CONDITIONS

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**FIGURE 1:
AREA OF APPROVED
DISTURBANCE (FOR THE
PURPOSE OF CONDITION A2)**

- Watercourses
Area of Approved
Disturbance
ML 80003
Cadastral Boundaries

5778 張建華等：中國經濟發展與環境污染：基於省級面板數據的檢驗



Datum: GDA 1994
Projection: MGA Z56

Definitions

Key terms and/or phrases used in this document are defined in this section. Applicants should note that where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Model Definitions	
acid rock drainage	means any contaminated discharge emanating from a mining activity formed through a series of chemical and biological reactions, when geological strata is disturbed and exposed to oxygen and moisture.
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 (dBL).
appropriately qualified person	means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis on performance relating to the subject matter using the relevant protocols, standards, methods or literature.
background	with reference to the water schedule, means the average of samples taken prior to the commencement of mining from the same waterway that the current sample has been taken.
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.
chemical	means: (a) an agricultural chemical product or veterinary chemical product within the meaning of the <i>Agricultural and Veterinary Chemicals Code Act 1994 (Commonwealth)</i>; or (b) a dangerous good under the Australian Code for the Transport of Dangerous Goods by Road and Rail approved by the Australian Transport Council; or (c) a lead hazardous substance within the meaning of the Workplace Health and Safety Regulation 1997; (d) a drug or poison in the Standard for the Uniform Scheduling of Drugs and Poisons prepared by the Australian Health Ministers' Advisory Council and published by the Commonwealth; or (e) any substance used as, or intended for use as: i. a pesticide, insecticide, fungicide, herbicide, rodenticide, nematocide, miticide, fumigant or related product; or ii. a surface active agent, including, for example, soap or related detergent; or iii. a paint solvent, pigment, dye, printing ink, industrial polish, adhesive, sealant, food additive, iv. bleach, sanitiser, disinfectant, or biocide; or v. a fertiliser for agricultural, horticultural or garden use; or vi. a substance used for, or intended for use for mineral processing or treatment of metal, pulp and paper, textile, timber, water or wastewater; or vii. manufacture of plastic or synthetic rubber.
commercial place	means a workplace used as an office or for business or commercial purposes, which is not part of the mining activity and does not include employees' accommodation or public roads.
construction or	in relation to a regulated structure includes building a new regulated structure

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constructed	and lifting or otherwise modifying an existing regulated structure, but does not include investigations and testing necessary for the purpose of preparing a design plan.
disturbance	of land includes: (a) compacting, removing, covering, exposing or stockpiling of earth; (b) removal or destruction of vegetation or topsoil or both to an extent where the land has been made susceptible to erosion; (c) carrying out mining within a watercourse, waterway, wetland or lake; (d) the submersion of areas by tailings or hazardous contaminant storage and dam/structure walls; (e) temporary infrastructure, including any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be removed after the mining activity has ceased; or (f) releasing of contaminants into the soil, or underlying geological strata. However, the following areas are not included when calculating areas of 'disturbance': (a) areas off lease (e.g. roads or tracks which provide access to the mining lease); (b) areas previously disturbed which have achieved the rehabilitation outcomes; (c) by agreement with the administering authority, areas previously disturbed which have not achieved the rehabilitation objective(s) due to circumstances beyond the control of the mine operator (such as climatic conditions); (d) areas under permanent infrastructure. Permanent infrastructure includes any infrastructure (roads, tracks, bridges, culverts, dam/structures, bores, buildings, fixed machinery, hardstand areas, airstrips, helipads etc) which is to be left by agreement with the landowner. (e) disturbance that pre-existed the grant of the tenure.
EC	means electrical conductivity
effluent	treated waste water released from sewage treatment plants.
hazard category	means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in 'Manual for Assessing Hazard Categories and Hydraulic Performance of Dams'.
infrastructure	means water storage dams, levees, roads and tracks, buildings and other structures built for the purpose of the mining activity.
land	in the 'land schedule' of this document means land excluding waters and the atmosphere, that is, the term has a different meaning from the term as defined in the <i>Environmental Protection Act 1994</i> . For the purposes of the <i>Acts Interpretation Act 1954</i> , it is expressly noted that the term 'land' in this environmental authority relates to physical land and not to interests in land.
land use	means the selected post mining use of the land, which is planned to occur after the cessation of mining operations.
leachate	means a liquid that has passed through or emerged from, or is likely to have passed through or emerged from, a material stored, processed or disposed of at the operational land which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.
licensed place	means the resource activities carried out at the mining tenements detailed in this environmental authority.
m	means metres
mine affected water	(a) means the following types of water:

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	i. pit water, tailings dam water, processing plant water; ii. water contaminated by a mining activity which would have been an environmentally relevant activity under Schedule 2 of the Environmental Protection Regulation 2008 if it had not formed part of the mining activity; iii. rainfall runoff which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated, excluding rainfall runoff discharging through release points associated with erosion and sediment control structures that have been installed in accordance with the standards and requirements of an Erosion and Sediment Control Plan to manage such runoff, provided that this water has not been mixed with pit water, tailings dam water, processing plant water or workshop water; iv. groundwater which has been in contact with any areas disturbed by mining activities which have not yet been rehabilitated; v. groundwater from the mine's dewatering activities; vi. a mix of mine affected water (under any of paragraphs i-v) and other water. (b) does not include surface water runoff which, to the extent that it has been in contact with areas disturbed by mining activities that have not yet been completely rehabilitated, has only been in contact with: i. land that has been rehabilitated to a stable landform and either capped or revegetated in accordance with the acceptance criteria set out in the environmental authority but only still awaiting maintenance and monitoring of the rehabilitation over a specified period of time to demonstrate rehabilitation success; or ii. land that has partially been rehabilitated and monitoring demonstrates the relevant part of the landform with which the water has been in contact does not cause environmental harm to waters or groundwater, for example: • areas that are been capped and have monitoring data demonstrating hazardous material adequately contained with the site; • evidence provided through monitoring that the relevant surface water would have met the water quality parameters for mine affected water release limits in this environmental authority, if those parameters had been applicable to the surface water runoff; or iii. both.
measures	includes any measures to prevent or minimise environmental impacts of the mining activity such as bunds, silt fences, diversion drains, capping, and containment systems.
NATA	means National Association of Testing Authorities, Australia.
natural flow	means the flow of water through waters caused by nature.
non polluting	means having no adverse impacts upon the receiving environment.
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 (mm/s).
protected area	means (a) a protected area under the <i>Nature Conservation Act 1992</i>; (b) a marine park under the <i>Marine Parks Act 1992</i>; or (c) a World Heritage Area.
receiving environment	in relation to an activity that causes or may cause environmental harm, means the part of the environment to which the harm is, or may be, caused. The

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	receiving environment includes (but is not limited to): (a) a watercourse; (b) groundwater; and (c) an area of land marked B in the map referred to in condition A2. The term does not include land that is marked B in the map referred to in condition A2.
receiving waters	means the waters into which this environmental authority authorises releases of mine affected water.
rehabilitation	the process of reshaping and revegetating land to restore it to a stable landform
release event	means a surface water discharge from mine affected water storages or contaminated areas on the licensed place.
RL	means reduced level, relative to mean sea level as distinct from depths to water.
representative	means a sample set which covers the variance in monitoring or other data either due to natural changes or operational phases of the mining activities.
saline drainage	the movement of waters, contaminated with salts, as a result of the mining activity.
sensitive place	means: (a) a dwelling, residential allotment, mobile home or caravan park, residential marina or other residential premises; (b) a motel, hotel or hostel; (c) an educational institution; (d) a medical centre or hospital; (e) a protected area under the <i>Nature Conservation Act 1992</i>, the <i>Marine Parks Act 1992</i> or a World Heritage Area; or (f) a public park or gardens. <i>Note: The definition of 'sensitive place' and 'commercial place' is based on Schedule 1 of EPP Noise. That is, a sensitive place is inside or outside on a dwelling, library & educational institution, childcare or kindergarten, school or playground, hospital, surgery or other medical institution, commercial & retail activity, protected area or an area identified under a conservation plan under Nature Conservation Act 1992 as a critical habitat or an area of major interest, marine park under Marine Parks Act 2004, park or garden that is outside of the mining lease and open to the public for the use other than for sport or organised entertainment. A commercial place is inside or outside a commercial or retail activity. A mining camp (i.e., accommodation and ancillary facilities for mine employees or contractors or both, associated with the mine the subject of the environmental authority) is not a sensitive place for that mine or mining project, whether or not the mining camp is located within a mining tenement that is part of the mining project the subject of the environmental authority. For example, the mining camp might be located on neighbouring land owned or leased by the same company as one of the holders of the environmental authority for the mining project, or a related company. Accommodation for mine employees or contractors is a sensitive place if the land is held by a mining company or related company, and if occupation is restricted to the employees, contractors and their families for the particular mine or mines which are held by the same company or a related company. For example, a township (occupied by the mine employees, contractors and their families for multiple mines that are held by different companies) would be a sensitive place, even if part or all of the township is constructed on land owned by one or more of the companies.</i>

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the Act	means the <i>Environmental Protection Act 1994</i> .
µS/cm	means micro siemens per centimetre.
watercourse	has the same meaning given in the <i>Water Act 2000</i> .
water quality	means the chemical, physical and biological condition of water.
waters	includes river, stream, lake, lagoon, pond, swamp, wetland, unconfined surface water, unconfined natural or artificial watercourse, bed and bank of any waters, dams, non-tidal or tidal waters (including the sea), storm water channel, storm water drain, and groundwater and any part thereof.
Site specific conditions "percent slope"	$= \frac{\text{height difference (metres)}}{\text{horizontal difference (metres)}} \times 100$
refinery fuel gas	means all non-condensable hydrocarbons produced as a result of refinery processes.
TEQ	means World Health Organisation Toxicity Equivalency Quotient. For the purposes of assessing compliance with dioxin conditions of this authority, determined concentrations which are below the laboratory analytical detection limit are deemed to be zero, For the purpose of assessing whether analytical detection limits are acceptable, both lower and upper bound TEQ values must be considered.
Additional Air Definitions	
Normal cubic metre (m³)	means the volume of dry gaseous contaminant which occupies 1 cubic metre at a temperature of zero degrees Celsius and at an absolute pressure of 101.3 kilopascals.
Odour Unit (ou)	means that concentration of odorant(s) at standard conditions that elicits a physiological response from a panel (detection threshold) equivalent to that elicited by one Reference Odour Mass (ROM), evaporated in one cubic metre of neutral gas at standard conditions as measured under AS/NZS-4323.3:2001 - Australian and New Zealand Standard, Stationary source emissions - Determination of odour concentration by dynamic olfactometry
Odour emission rate ("odour unit volumes per minute" - "ouV/min")	means the arithmetic product of the odour concentration of the release of contaminants and the volume rate of discharge (in wet cubic metres per minute referred to a temperature of zero degrees Celsius and a pressure of 101.3 kilopascals.
Reference Odour Mass (ROM)	means the acceptable reference value for the odour unit, equal to a defined mass of a certified reference material. One ROM is equivalent to 132 µg n-butanol which evaporated in 1 cubic metre of neutral gas at standard conditions produces a concentration of 40 ppb (µmol/mol).
Rolling Average of previous 30 consecutive samples	in respect of odour measurement means the arithmetic average that is calculated every instance a new odour concentration monitoring result is obtained using that most recent result and the previous 29 consecutive odour concentration monitoring results. In all instances, the arithmetic average concentration calculated must not exceed the relevant release limit.
Total Organic Carbon ("TOC")	means the sum of all compounds of carbon that contain at least one carbon to carbon bond plus methane and its derivatives. For the purpose of measurement 1 gram of TOC is deemed to have the same flame ionisation response as 1 gram of Hexane.

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