

Permit

Environmental Protection Act 1994

Environmental authority EPPG00885313

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

Environmental authority number: EPPG00885313

Environmental authority takes effect on 17 August 2021

Environmental authority holder(s)

Name(s)	Registered address
AUSTRALIA PACIFIC LNG PTY LIMITED	Level 4 139 Coronation Drive MILTON QLD 4064 Australia
AUSTRALIA PACIFIC LNG CSG MARKETING PTY LIMITED	Level 4 139 Coronation Dr MILTON QLD Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 03: A petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area	PL268, PL417, PL200, PL415, PL414, PL416, PL419, PL195, PL418, PL204
Schedule 3 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL268, PL417, PL200, PL415, PL414, PL416, PL419, PL195, PL418, PL204
Schedule 3 07: A petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer	PL268, PL417, PL200, PL415, PL414, PL416, PL419, PL195, PL418, PL204
Resource Activity, Ancillary 63 – Sewerage Treatment 1: Operating sewage treatment works, other than no release works, with a total daily peak design capacity of, (a-ii) 21 to 100EP otherwise	PL268, PL417, PL200, PL415, PL414, PL416, PL419, PL195, PL418, PL204

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Resource Activity, Ancillary 63 – Sewerage Treatment 1: Operating sewage treatment works, other than no release works, with a total daily peak design capacity of, (b-ii) more than 100 but not more than 1,500EP otherwise	PL268, PL417, PL200, PL415, PL414, PL416, PL419, PL195, PL418, PL204
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Additional information for applicantsEnvironmentally relevant activities

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

An EA authorises the carrying out of an ERA and does not authorise any environmental harm unless a condition stated by the EA 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 an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

- the happening of an event involving a hazardous contaminant on the contaminated land (notice must be given within 24 hours); or
- a change in the condition of the contaminated land (notice must be given within 24 hours); or
- a notifiable activity (as defined in Schedule 3) having been carried out, or is being carried out, on the contaminated land (notice must be given within 20 business days)

that is causing, or is reasonably likely to cause, serious or material environmental harm.

For further information, including the form for giving written notice, refer to the Queensland Government website www.qld.gov.au, using the search term 'duty to notify'.

Take effect

Please note that, in accordance with section 200 of the EP Act, an EA has effect:

- a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or
- b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or
- c) otherwise- one the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

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If this EA takes effect when the additional authorisation takes effect, you must provide the administering authority written notice within 5 business days of receiving notification of the related additional authorisation taking effect.

The anniversary day of this environmental authority is the same day each year as the effective date. The payment of the annual fee will be due each year on this day. An annual return will be due each year on 01 March.

If you have incorrectly claimed that an additional authorisation is not required, carrying out the ERA without the additional authorisation is not legal and could result in your prosecution for providing false or misleading information or operating without a valid environmental authority.

Clancy Mackaway
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Date issued: 17 August 2021

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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)

Legislative Requirements and Conditions of Environmental Authority

SCHEDULE A – GENERAL CONDITIONS

Authorised Petroleum Activities

- (A1) This environmental authority authorises the carrying out of the following resource activities:
- (a) the petroleum activities and specified relevant activities listed in *Schedule A: Table 1 - Authorised Petroleum Activities* to the extent they are carried out in accordance with the activity's corresponding scale or intensity or both (where applicable); and
 - (b) incidental activities that are not otherwise specified relevant activities.
- (A2) The authorised resource activities are authorised subject to the conditions of this environmental authority.
- (A3) This environmental authority does not authorise a relevant act to occur in carrying out an authorised resource activity unless a condition expressly authorises that relevant act to occur. Where there is no condition, the lack of a condition must not be construed as authorising the relevant act.

Schedule A: Table 1 – Authorised petroleum activities and specific relevant activities

Authorised Petroleum Activity	Scale		Intensity
	Maximum size	Location	
Petroleum activities			
Coal seam gas production and exploration	720 ha (wells only)	Within project area	600 wells
Underground Gas Storage	1.13 Bscf	Coal Ridge Bandanna Coal Measures	2 wells
Specified relevant activities			
Stimulation activities	N/A	Within project area	N/A
Electricity generation—by using gas (permanent, in isolation or combined in operation, or interconnected) at a rated capacity of 10 megawatt (MW) electrical or more	N/A	Within project area	50 MW for project area
Operating fuel burning equipment (permanent, in isolation or combined in operation, or interconnected) that is capable of burning more than 500kg of fuel in an hour	N/A	Within project area	N/A
Chemical storage (permanent) that meets any of the thresholds described in Schedule 2, Part 2, section 8 of the Environmental Protection Regulation 2008	>50t of chemicals of DG class 1 or 2, division 2.3 >500m³ of chemicals of class	Within project area	600 storages at well leases; N/A at other permanent facilities

Authorised Petroleum Activity	Scale		Intensity
	Maximum size	Location	
	C1 or C2 combustible liquids under AS 1940 or DG Class 3 >200m ³ of chemicals that are liquids		
Sewage treatment works, other than no-release works, where treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme; or otherwise discharged	1,500 EP per facility	Within project area	11,600 EP for project area
Waste disposal onsite—operating a facility for disposing of greater than 50t of non-regulated waste in a year (includes land spraying while drilling, or mix-bury-cover where the drill muds do not have any substances that would make it a regulated waste)	N/A	Within project area	600 facilities
Waste disposal onsite—operating a facility for disposing of more than 200,000t of general waste (injection of treated water or wastewater)	9,350 m ³ /day	Within project area	3 injection wells
Regulated waste storage—any structure, including regulated, low consequence dams, and other dams containing regulated waste	N/A	Within project area	321.5 ha across 18 dams
Water treatment activities—treating 10ML or more of raw water in a day in a way that allows waste, whether treated or untreated, to be released into the environment	12 ML/day	Within project area	1 water treatment facility; 1 release point
Storing waste that is not regulated waste (including coal seam gas water) in a regulated dam	N/A	Within project area	48 regulated dams
Storing coal seam gas water that is not regulated waste in a low consequence dam	N/A	Within project area	600 low consequence dams
Borrow pits or quarries that extract more than 5000 tonnes of material in the project area	N/A	Within project area	N/A

Maintenance of Measures, Plant and Equipment

- (A4) The holder of this authority must ensure that:
- (a) all measures, plant and equipment necessary to ensure compliance with the conditions of this authority are installed;
 - (b) such measures, plant and equipment are maintained in a proper condition; and
 - (c) such measures, plant and equipment are operated in a proper manner.

Documentation and Records Management

- (A5) A record of all documents including reports required by this environmental authority must be kept for a minimum of five years and provided to the administering authority upon request.
- (A6) The holder of this environmental authority must develop all documents required under this environmental authority in a way that is consistent with the requirements of this environmental authority.

Underground Gas Reinjection Pilot Trial

- (A7) Conditions (A8) to (A16) relate only to the Underground Gas Reinjection Pilot Trial.
- (A8) The only gas to be reinjected and stored underground is coal seam gas.
- (A9) Gas reinjection must only be injected at the location(s) and within the formation(s) and impact zones listed in *Schedule A: Table 2 – Details of Authorised Storage Formation*.

Schedule A: Table 2 – Details of Authorised Storage Formation

Well Location (Latitude and Longitude (GDA94) or Map Ref)	Well Number / Reference	Target Formation	Gas Injection Impact Zone
25° 52' 51.11143° S 149° 08' 05.37540° E	Spring Gully 01 (SG01)	Coal Ridge Bandanna Coal Measures	5 kilometres
25° 52' 53.05429° S 149° 08' 51.44365° E	Spring Gully 21 (SG21)	Coal Ridge Bandanna Coal Measures	5 kilometres

- (A10) Gas reinjection must not result in:
- (a) fracturing the target formation;
 - (b) surface migration of the injected gas;
 - (c) loss of containment from within the impact zones;
 - (d) ingress to building and structures; or
 - (e) fugitive emissions.

- (A11) If the holder of this environmental authority becomes aware that environmental harm is caused or threatened to be caused as a result of the gas reinjection pilot trial, the holder of this authority must immediately cease the reinjection activity and implement appropriate measures to prevent or minimise the harm.
- (A12) The maximum quantity of gas authorised to be reinjected and stored underground under this environmental authority is 1.13 Bscf.
- (A13) The maximum surface injection pressure must not exceed 900 psia.
- (A14) Tracers must not be injected underground.
- (A15) The gas reinjection pilot trial must not exceed 24 weeks.
- (A16) The administering authority must be notified in writing within 24 hours of commencing gas reinjection at the authorised locations in *Schedule A: Table 2 – Details of Authorised Storage Formation*.

Gas Reinjection Trial Report

- (A17) A gas injection trial report which has been developed and certified by a suitably qualified person must be submitted to the administering authority within three months of the cessation of the gas reinjection trial.
- (A18) The gas reinjection trial report must include the results of the Gas Injection Trial Impact Monitoring Program required by conditions (A19) and (A20) and provide interpretation and analysis of information which includes but which is not necessarily limited to:
- (a) analysis of monitoring and operational data in terms of:
 - i. validation of conceptual framework for injection;
 - ii. additional hazards that were not identified earlier;
 - (b) a re-evaluation of the gas injection impact zone; and
 - (c) a detailed interpretation of the logs and other tests conducted during drilling and construction or refurbishment of the well against their specific objectives;
 - (d) the effectiveness of aquitards (including the stability of the aquitard) and aquicludes of confining the injected gas within the target formation;
 - (e) an assessment of previous risk assessment(s) including identified hazards and their inherent risk, the efficacy of preventative measures and residual risk; and
 - (f) a revised risk analysis in consideration of the findings of condition (A18)(e), including identification of any hazards that weren't identified earlier, altered likelihoods of risk and associated consequences and new necessary preventative measures for those risks;
 - (g) if relevant, reinjection well injection closure and decommissioning details;
 - (h) an assessment of all monitoring results including verification that the reinjection trial was carried out without incident or environmental harm;

- (i) an assessment of compliance with the conditions of this environmental authority.

Gas Injection Trial Impact Monitoring Program

- (A19) A Gas ReInjection Trial Monitoring Program must be developed and certified by a suitably qualified person and be implemented from commencement of the trial for a total period of 36 weeks.
- (A20) The Gas ReInjection Trial Monitoring Program must be based on a risk assessment to ensure the injection activities are managed to prevent environmental harm and include, but not necessarily be limited to:
 - (a) establishment of baseline data relevant to the reinjection locations including but not limited to:
 - i. identification of the gas injection impact zone;
 - ii. estimated volume and rates of gas to be injected;
 - iii. relevant analytes and physico-chemical parameters to be monitored in order to establish baseline conditions, including water quality;
 - iv. development of a hydrogeological conceptualisation that includes:
 - a. characterisation of aquifer geometry;
 - b. physiochemical and hydraulic properties (including groundwater levels / pressure) of the target formation as well as surrounding geological formations;
 - c. associated recharge and discharge processes that may influence movement and storage of the reinjected gas;
 - (b) description of assumptions, predicted impacts and anticipated effectiveness of preventative measures (including details of any control or reference sites, methods for analysis and interpretation including a description of the statistical basis on which conclusions will be drawn);
 - (c) monitoring to manage potential hazards including details on sampling and analysis methods (including frequency and locations) and quality assurance and control measures including but not limited to:
 - i. a casing integrity assessment for the reinjection wells using techniques such as:
 - a. cement integrity log; or
 - b. Ultra Sonic Imaging Tool (USIT) log; or
 - c. sonic Volume Density log (VDL); or
 - d. an equivalent survey technique approved by the administering authority;
 - ii. hydraulic gradient of the target formation within the Petroleum Lease (PL) 204;
 - iii. for the 36 week period and for each reinjection well:
 - a. continuous monitoring and recording of injection pressure, flow rate, cumulative volume of the gas and pressure of the target formation;
 - b. a temperature survey;
 - c. profiling of the gas plume including rate of movement;
 - d. weekly gas monitoring of the target formation;
 - e. monthly groundwater level monitoring of the target formations, all other potentially affected

- aquifer(s) and all potentially affected landholder(s) bores;
- f. any other monitoring required to verify the performance of gas reinjection including verification that gas reinjection has been successfully confined to the gas reinjection impact zone;
- iv. during gas reinjection activities only and for each reinjection well:
 - a. well head injections rates versus formation pressure;
 - b. daily monitoring and recording of the quantity of gas injected;
 - c. weekly summaries of injection conditions.

Contingency procedures for Emergency Environmental Incidents

- (A21) Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to:
- (a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.
 - (b) consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.
 - (c) response procedures to be implemented to prevent or minimise the risks of environmental harm occurring.
 - (d) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.
 - (e) procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.
 - (f) training of staff to enable them to effectively respond.
 - (g) procedures to notify the administering authority, local government and any potentially impacted landholder.
- (A22) All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.

SCHEDULE B – WATER

Contaminant Release

- (B1) Contaminants must not be directly or indirectly released to any waters except as permitted under this environmental authority as specified in Schedule B.

Release of Treated Coal Seam Gas Water

- (B2) The release of treated CSG water must only occur from the release point specified in *Schedule B: Table 1-*

– Contaminant Release Points, Sources and Receiving Waters.

Schedule B: Table 1 – Contaminant Release Points, Source and Receiving Waters

Release Point	Latitude or Northing (GDA94)	Longitude or Easting (GDA94)	Contaminant Source and Location	Monitoring Point	Receiving Waters Description
Spring Gully WTF Release Point (SG-WTF010)	7122432 N	708423 E	Treated Coal Seam Gas water from the RO plant located on PL 195	R1 - Outlet of discharge pipe to Eastern Gully	Eastern Gully, a tributary to Eurombah Creek

- (B3) The release of treated CSG water to waters must not exceed the release limits and limit types stated in *Schedule B: Table 2 - Contaminant Release Limits* and *Schedule B: Table 3 – Contaminant Release Limits for the protection of drinking water values*, when measured at the monitoring point specified in *Schedule B: Table 1- Contaminant Release Point, Source and Receiving Waters* for each quality characteristic.

Schedule B: Table 2 – Contaminant Release Limits

Quality Characteristic	Release Limits	Limit Type	Monitoring Frequency
pH (pH Unit)	6.5 – 9.0	Minimum and maximum range	Daily during release
Boron (mg/L)	1.0	Maximum	Weekly during release
Electrical Conductivity (µS/cm)	370	12 months daily average	Daily during release
	425	Maximum	Daily during release
Temperature Difference (°C)	± 4	Maximum temperature difference between the location (709584 E, 7122194 N) downstream of the Eastern Gully confluence and the location (709483 E, 7122084 N) upstream of the Eastern Gully Confluence	Daily during release
Calcium (mg/L)	5.0	Minimum	Daily during release
Turbidity (NTU)	50	Maximum	Weekly during release
Dissolved oxygen (mg/L)	2	Minimum	
Chloride (mg/L)	175	Maximum	
Sodium (mg/L)	115	Maximum	
Sulphate (mg/L)	5	Maximum	
Alkalinity (mg/L)	Nil	Nil	
SAR (mg/L)	Nil	Nil	

Note: Monitoring of temperature only required when there is natural flow in Eurombah Creek.

Schedule B: Table 3 –Contaminant Release Limits for the protection of drinking water values

Quality Characteristic		Release Limit	Limit Type	Monitoring Frequency
Radiological compounds (Alpha & Beta Emitters)		0.5 Bq/L	Maximum	On the first release day of each quarter
Aluminium		0.2 mg/L	Maximum	
Ammonia		0.5 mg/L	Maximum	
Arsenic		0.01 mg/L	Maximum	
Barium		0.7 mg/L	Maximum	
Bisphenol A		0.2 mg/L	Maximum	
Boron		4 mg/L	Maximum	
Bromide		7 mg/L	Maximum	
Bromoform		0.1 mg/L	Maximum	
Benzene		0.001 mg/L	Maximum	
Toluene		0.800 mg/L	Maximum	
Ethylbenzene		0.300 mg/L	Maximum	
Xylene (all isomers)		0.600 mg/L	Maximum	
Cadmium		0.002 mg/L	Maximum	
Chromium		0.05 mg/L	Maximum	
Copper		2 mg/L	Maximum	
Cyanide		0.08 mg/L	Maximum	
Fluoride		1.5 mg/L	Maximum	
Iodide		0.1 mg/L	Maximum	
Iron		0.3 mg/L	Maximum	
Lead		0.01 mg/L	Maximum	
Manganese		0.5 mg/L	Maximum	
Mercury		0.001 mg/L	Maximum	
Molybdenum		0.05 mg/L	Maximum	
Nickel		0.02 mg/L	Maximum	
Nonylphenol		0.5 mg/L	Maximum	
PAH (as B(a)P TEF)		0.01 µg/L	Maximum	
Species:	TEF:			
benz[a]anthracene	0.1			
benzo[b+j]fluoranthene	0.1			
benzo[k]fluoranthene benzo[a]pyrene	0.1			
chrysene	1.0			
dibenz[a,h]anthracene	0.01			
indeno[1,2,3 cd]pyrene	5.0			

Quality Characteristic		Release Limit	Limit Type	Monitoring Frequency
	0.1			
Selenium		0.01 mg/L	Maximum	
Sulphate		500 mg/L	Maximum	
Strontium		4 mg/L	Maximum	
Total Petroleum Hydrocarbons (TPH)		0.2 mg/L	Maximum	
Vanadium		0.05 mg/L	Maximum	
Zinc		3 mg/L	Maximum	

- (B4) The release of treated CSG water to waters from the release point must be monitored at the monitoring point specified in *Schedule B: Table 1 - Contaminant Release Points, Source and Receiving Waters* for each quality characteristic and at the frequency in *Schedule B: Table 2 - Contaminant Release Limits* and *Schedule B: Table 3 –Contaminant Release Limits for the protection of drinking water values*.
- (B5) Notwithstanding any other condition of this environmental authority, the release of treated CSG water in accordance with condition (B2) must only take place in the following situations:
- (a) if the volume of treated CSG water exceeds the beneficial use demand or aquifer injection requirements when measured on a daily basis; and
 - (b) environmental values will be protected despite the release.
- (B6) The maximum volume of treated CSG water that may be released in accordance with condition (B2) must not exceed 10.2 ML per day and 700 ML in any calendar year.
- (B7) The release of treated CSG water to waters in accordance with Condition (B2) must not cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.
- (B8) The release of treated CSG water to waters in accordance with Condition (B2) must be undertaken so as not to cause flooding of Eurombah Creek during average rainfall events.
- (B9) If the monitoring required by condition (B4) indicates that any of the quality characteristic release limits specified in *Schedule B: Table 2 - Contaminant Release Limits*, have been exceeded at any time during any release of treated CSG water, the holder of this authority must:

- (a) notify the administering authority within five business days; and
 - (b) complete an investigation in accordance with the ANZECC & ARMCANZ 2000 methodology into the potential for environmental harm and provide a written report to the administering authority in the next annual return outlining:
 - i. details of the investigations carried out; and
 - ii. actions taken to prevent and/or minimise environmental harm.
- (B10) If the monitoring required by condition (B4) indicates that any of the quality characteristic release limits specified in *Schedule B: Table 3 –Contaminant Release Limits for the protection of drinking water* have been exceeded at any time during any release of treated CSG water, the environmental authority holder must, within three months of notifying the administering authority of the exceedance, unless a longer time is agreed to by the administering authority:
- (a) complete an investigation into the potential for impacts to drinking water resulting from the exceedance, which includes an analysis of the (potential and actual) causes for the exceedance; and
 - (b) provide a written report to the administering authority and the local Public Health Unit (<https://www.health.qld.gov.au/system-governance/contact-us/contact/public-health-units/default.asp>) on completion of the investigation that includes:
 - i. details of the investigation carried out;
 - ii. any actions taken to prevent impacts to drinking water;
 - iii. the cause for the exceedance;
 - iv. all water quality monitoring results pertaining to the investigation;
 - v. any general observations;
 - vi. methodology(ies) and any relevant calculations used; and
 - vii. corrective actions to rectify the cause of the exceedance.
- (B11) Where an exceedance of a quality characteristic release limit specified in *Schedule B: Table 3 – Contaminant Release Limits for the protection of drinking water* is being investigated in accordance with condition (B10), the investigation and reporting required by condition (B10) is not required if a subsequent exceedance occurs, during investigation of the initial exceedance, which has resulted from the same cause that triggered the initial exceedance.
- (B12) Each authorised monitoring and release point must be conspicuously marked and be readily identifiable from the banks of Eastern Gully and/or Eurombah Creek.
- (B13) Reasonable access to the water quality monitoring points must be provided.
- (B14) The environmental authority holder must install and maintain a measuring device to measure/meter the volume of treated CSG water released under the environmental authority.
- (B15) The measuring device/ meter must be installed prior to commencement of release of treated coal seam gas

water.

- (B16) Records of all releases required by condition (B2) must include the following information:
- (a) the daily and total volume released to waters from the release point at the monitoring point in *Schedule B: Table 1 – Contaminant Release Points, Source and Receiving Waters*;
 - (b) the daily release rate;
 - (c) for any change in the release rate:
 - i. the date and time of the change; and
 - ii. the new release rate; and
 - (d) the daily flow rate of the receiving waters measured at the gauging station (130376A Eurombah Creek at Brookfield);
 - (e) all water quality monitoring results; and
 - (f) any other matters pertinent to the water release event, including a description of the receiving environment prior to each release.

Receiving Environment Monitoring Program (REMP)

- (B17) A REMP must be developed and implemented to monitor and record the effects of the release of contaminants on the receiving environment whilst contaminants are being released. The REMP must identify and describe the extent of any potentially adverse environmental impacts to local environmental values, and monitor any changes in the receiving water of Eurombah Creek. For the purposes of the REMP the receiving environment is defined as the waters of Eurombah Creek and includes monitoring points SGSW7 and SGSW34.
- (B18) The REMP must be maintained by a suitably qualified person and made available to the administering authority upon request.
- (B19) The REMP must address, but not be limited to:
- (a) a description of the receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal variation (e.g. seasonality);
 - (b) a description of applicable environmental values, including but not limited to:
 - i. hydrology (flow, duration, periodicity, connectivity with groundwater systems);
 - ii. physiochemical properties;
 - iii. aquatic ecosystem parameters including flow and fauna habitat; and
 - iv. geomorphological features;
 - (c) a description of water quality objectives to be achieved (i.e. as scheduled pursuant to the Environmental Protection (Water and Wetland Biodiversity) Policy 2019);
 - (d) any relevant reports prepared by other governmental or professional research organisations that relate to the receiving environment within which the REMP is proposed;

- (e) water quality targets within the receiving environment to be achieved, and clarification of contaminant concentrations or levels indicating adverse environmental impacts during the REMP;
- (f) monitoring for any potential adverse environmental impacts caused by the release including impacts to bank stability and erosion;
- (g) monitoring of stream flow and hydrology;
- (h) monitoring of the information required under (B16), including daily and total release volume and release rate.
- (i) monitoring and assessment of the banks and beds of the receiving environment for SAR and an assessment of bank soil / bed sediment erosion, and rating curve of discharge versus shear stress to demonstrate that releases would not result in erosion;
- (j) monitoring of contaminants should consider the limits specified in *Schedule B: Table 2 – Contaminant Release Limits for Release Point* to assess the extent of the compliance of water quality parameters and/or the ANZECC & ARM CANZ 2000 guidelines for slightly to moderately disturbed ecosystems;
- (k) monitoring of physico-chemical parameters as a minimum those specified in *Schedule B: Table 2 – Contaminant Release Limits for Release Point* (in addition to dissolved oxygen saturation);
- (l) a description of the temporal trends of water quality contaminants of concern for each sampling point as well an interpretation taking into consideration stream flow, release flow and rainfall data;
- (m) maintain an aquatic invertebrate monitoring program in accordance with the AusRivAS methodology and a program to metals/metalloids in sediments (in accordance with ANZECC & ARM CANZ 2000, A Guide To The Application Of The ANZECC & ARM CANZ Water Quality Guidelines In The Minerals Industry (BATLEY et al) and/or the most recent version of AS5667.1 Guidance on Sampling of Bottom Sediments) for permanent, semi-permanent water holes and water storages;
- (n) monitoring of a selection of phytoplankton abundance and diversity species to assess health (e.g. exoskeleton density) in respect to the availability of calcium and magnesium;
- (o) the methods for analysis and interpretation of all monitoring results;
- (p) the locations of monitoring points (including the locations of proposed upstream and downstream impacted sites for each release point);
- (q) the frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two years (depending on wet season flows) in accordance with the Queensland Water Quality Guidelines 2009. For ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
- (r) specify sampling and analysis methods and quality assurance and control;
- (s) any historical data sets to be relied upon;
- (t) description of the statistical basis on which conclusions are drawn;
- (u) any analogue or reference sites; and
- (v) recording of planned and unplanned releases to watercourses, procedures for event monitoring, monitoring methodology used and procedure to establish background surface water quality.

- (B20) Revisions to the REMP must be prepared and submitted in writing to the administering authority prior to implementation of the revised REMP.
- (B21) A report outlining the findings of the REMP, including all monitoring results and interpretations must be prepared annually and be made available to the administering authority upon request. This must include an assessment of background reference water quality, the condition of downstream water quality compared against water quality objectives, and the suitability of current release limits to protect downstream environmental values.
- (B22) The report required by Condition (B21) must include a demonstration of long-term data sets for boron levels.

Discharge to Waters Release Strategy

- (B23) The holder of this authority must prepare and submit a Discharge to Waters Release Strategy on treated coal seam gas water to the administering authority before 31 October 2014, should the holder of this authority intend to continue the discharge of treated coal seam gas water to Eurombah Creek.
- (B24) The strategy required by condition (B23) must, at a minimum:
- (a) be based on observed flows; and
 - (b) include trigger thresholds for the commencement and cessation of the releases; and
 - (c) include a monitoring and reporting scheduling (including provisions for the establishment of an upstream gauging station); and
 - (d) take into account pre-development flow regimes; and
 - (e) identify opportunities to restore flows to a pre-development state to as great an extent as is practicable.

Water Release Reduction Strategy

- (B25) As part of the Associated Water Management Plan (AWMP) the holder of this authority must develop and implement an on-going Release Reduction Strategy to maximise associated water re-use and to minimise any release to waters from the reverse osmosis (RO) plant located on PL195.
- The strategy must address the following matters:
- (a) implementation of re-use measures to achieve maximum use of the water;
 - (b) specific targets for achieving increased re-use of treated and untreated associated water;
 - (c) a market analysis at least every three years to identify existing and future opportunities for water re-use;
 - (d) on-going review of emerging technologies and/or re-use options that could achieve significant reductions in mass loads of contaminants released to the environment;
 - (e) investigation of the feasibility of alternative options, practices and procedures to further minimise the volume and concentration of contaminants released to waters; and

- (f) programs to implement feasible options to achieve increased water re-use and reduction in contaminant loads, including actions and timeframes for completion.
- (B26) A progress report on the Release Reduction Strategy must be submitted to the administering authority with each annual return. The report(s) must address at least the following matters:
- (a) details of the specific options, practices and procedures investigated;
 - (b) details of new practices, procedures and programs implemented since the last reporting period and targets met;
 - (c) where alternative options, practices and procedures are not considered feasible, the provision of justification to support that determination; and
 - (d) details of the option(s) yet to be implemented, including the timeframes for implementation, and justification for the chosen option(s).

Water General

- (B27) The release of treated CSG water directly or indirectly to waters:
- (a) must not produce any visible plume within receiving waters; and
 - (b) must not produce any slick or other visible or odorous evidence of oil, grease or petrochemicals nor contain visible floating oil, grease, scum, litter or other objectionable matter.
- (B28) Regulated structures and dams must be securely fenced and / or screened after construction is completed to:
- (a) exclude and prevent the entrapment of livestock and wildlife; and
 - (b) provide escape arrangements for any trapped livestock and wildlife; and
 - (c) limit habitats for the introduction or spread of pests.
- (B29) The method of water sampling required by this environmental authority must comply with that set out in the most recent version of the Queensland Monitoring and Sampling Manual published by the administering authority.
- (B30) All determinations of water quality must be:
- (a) performed by a person or body possessing appropriate experience and qualifications to perform the required measurements; and
 - (b) carried out on representative samples.
- (B31) All analyses and tests required to be conducted under this environmental authority must be carried out by a laboratory that has NATA Accreditation for such analyses and tests, except as otherwise authorised by the administering authority, such as in-situ analyses, e.g. electrical conductivity, temperature, turbidity, pH and dissolved oxygen if they are taken with a suitable water analysis probe.
- (B32) Despite condition (B31), analyses and tests required to determine the receiving soil criteria and the

suitability of drilling by-product for the land spraying while drilling method in accordance with condition (H7) can be carried out on site.

Erosion and Sedimentation

(B33) The holder of this authority must:

- (a) in areas with the potential for significant erosion, design, install and maintain adequate contour banks and diversion drains to minimise the potential for stormwater runoff to enter disturbed areas by petroleum activities; and
- (b) design, install and maintain adequate erosion and sediment control structures to prevent or minimise erosion of disturbed areas and the sedimentation of any waters.

Seepage Monitoring Program

(B34) A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants by 31 May 2015.

(B35) The seepage monitoring program required by condition (B34) must include but not necessarily be limited to:

- (a) identification of the containment facilities for which seepage will be monitored;
- (b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities;
- (c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities;
- (d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts;
- (e) installation of seepage monitoring bores that:
 - i. are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact);
 - ii. provide for the early detection of negative impacts prior to reaching groundwater dependent ecosystems, landholder's active groundwater bores, or water supply bores;
 - iii. provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations);
- (f) monitoring of groundwater at background and seepage monitoring bores for the trigger parameters identified in condition (B35)(b) at a frequency, determined by a suitably qualified person and:
 - i. at least once every two years where baseline data has been established; or
 - ii. at least quarterly for two years to establish baseline data for any impact to groundwaters,

after which time monitoring may continue at the frequency according to condition (B35)(f)(i);

- (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (B35(b)) and (B35(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination;
- (h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and
- (i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

(B36) A Re-injection Management Plan must be prepared and submitted to the administering authority for review and the administering authority's recommendations must be taken into account before any re-injection takes place.

(B37) If direct re-injection is chosen, evidence must be provided that the associated water will be re-injected into a geologically isolated zone and that the re-injection process will pose no unacceptable risks to other aquifers of environmental, social or economic importance, or interfere with existing or potential coal mining activities.

Injection of CSG Water

(B38) The only fluids authorised to be injected into an aquifer(s) formations are fluid types and at quantities and locations listed in *Schedule B: Table 4 – Details of Authorised Fluid Injection*.

Schedule B: Table 4 – Details of Authorised Fluid Injection

Well Location (Latitude & Longitude)	Well Number/ Reference	Target Formation	Fluid Type	Water Quality Impact Zone
- 26° 00' 00.79"S 149° 04' 15.91" E	DRP-WI-1	Precipice Sandstone	Treated CSG water	2 km radius from well site
-26° .00'01.09"S 149° .04'14.44"E	DRP-WI-2	Precipice Sandstone	Treated CSG water	2 km radius from well site
-25° .59'59.89"S 149° .04'16.89"E	DRP-WI-3	Precipice Sandstone	Treated CSG water	2 km radius from well site

(B39) If environmental harm has been caused or threatened as a result of the fluid injection activity(ies) including from the Organic Production Trial, fluid injection must cease immediately.

Well Integrity

(B40) Unless otherwise stated in the conditions of this environmental authority, injection wells must be

constructed according to the current standards applicable to water bore drilling activities under the *Water Act 2000*.

- (B41) Fluid injection well(s) authorised by this environmental authority must have appropriate records and documents which support and indicate mechanical integrity and which hold a certificate of mechanical integrity prepared and certified by a suitably qualified person, available for inspection such that:
- (a) there is no significant leakage in the casing; and
 - (b) there is no significant fluid movement into a water resource aquifer, other than the identified target aquifer, through vertical channels adjacent to the well bore hole.
- (B42) For fluid injection, the injection pressure must not exceed 3,700kPa which is 90% of the formation fracture pressure for injection at depth greater than 100m.

Injection Fluid Quality

- (B43) Fluid used in well injection must be measured at the point of injection and comply with the contaminant limits prescribed in *Schedule B: Table 5 – Specific Contaminant Limits in Injection Fluid*.

Schedule B: Table 5 – Specific Contaminant Limits in Injection Fluid

Contaminants	Contaminant limits in injection fluids
5	Maximum 500ppb
Electrical Conductivity	Maximum 460µS/cm
Total dissolved solids (TDS)	Maximum 300 mg/L
pH units	Minimum 6.5 Maximum 8.5

- (B44) The holder of this environmental authority must provide for non-chemical disinfection of injection fluid if results of six-monthly testing of injected fluid show levels of coliform bacteria, sulphate reducing bacteria or iron fixing bacteria that has potential to cause adverse impacts on the groundwater within the target formation.

Injection Management Plan

- (B45) The holder of this environmental authority must conduct fluid injection in accordance with the Australia Pacific LNG Upstream Phase 1 - Spring Gully Aquifer Injection Management Plan (ref.Q-8200-95-MP-1008).
- (B46) The Australia Pacific LNG Upstream Phase 1 - Spring Gully Aquifer Injection Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be produced and injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the

- water to be produced;
- (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is, treated and re-injected into the source aquifer;
 - (d) details of where the fluid is proposed to be treated including a description of the treatment process;
 - (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
 - (f) the regional characteristics of the receiving environment;
 - (g) identification of the water quality impact zone and the hydraulic impact zone;
 - (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
 - (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the Environmental Protection (Water) Policy 2009 and the Queensland Water Quality Guidelines 2009;
 - (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
 - (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
 - (l) verification methods to assess performance of the injection activities;
 - (m) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment;
 - (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (o) procedures that will be adopted to regularly review the monitoring program;
 - (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded;
 - (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results; and
 - (r) procedures for dealing with accidents, spills, failure of containment structures, and other incidents that may arise in the course of fluid injection.

Injection Monitoring Program

- (B47) At least two monitoring wells accessing only the target aquifer must be installed for assessment of:
- (a) hydrologic behaviour placed at one and at least ten units distant from the injection well, both located within the hydraulic impact zone and down gradient; and
 - (b) water quality response placed at one and at least ten units distant from the injection well, both

located within the water quality impact zone and down gradient.

Reporting Requirements for Operational Fluid Injection

- (B48) An operational fluid injection report which has been certified by a suitably qualified person must be submitted to the administering authority with each annual return.
- (B49) The operational fluid injection report must summarize the results of the Injection Monitoring Program and provided interpretation and analysis of those results including but not necessarily being limited to:
- (a) the results of the monitoring program as required by condition (B47);
 - (b) monthly summaries of injection conditions;
 - (c) commentary on changes to injection fluid characteristics or sources;
 - (d) mechanical integrity tests;
 - (e) pressure of the target formation;
 - (f) stability of overlying aquitard;
 - (g) an updated risk assessment providing details on potential hazards including their inherent risk, preventative measures & monitoring and the residual risk;
 - (h) quantity of fluid injected;
 - (i) quality parameters of fluid injected; and
 - (j) any well closure plan required under condition (B50) to (B53) inclusive.

Well Closure

- (B50) A Well Closure Plan must be submitted to the administering authority within six months prior to the cessation of fluid injection at a well.
- (B51) The Well Closure Plan must include, but not necessarily be limited to the following:
- (a) details of when and under what circumstances the injection well will be decommissioned;
 - (b) sealing details including the method, type of material to be used and the location and the depth (metres) from ground surface of the bottom of the seal will be located; and
 - (c) any proposed test or measure to be made.
- (B52) Actions outlined in the well closure plan must be completed within three months of the cessation of fluid injection at the injection well.
- (B53) Upon completion of injection activities at a fluid injection well, a well closure report demonstrating compliance with the well closure plan as required by conditions (B50) to (B52) for that well must be prepared by a suitably qualified person and submitted to the administering authority with the next annual return.

Injection Cessation Report

(B54) A fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two months of completion of fluid injection activities.

(B55) The fluid injection cessation report must include, but not necessarily be limited to:

- (a) volumes of fluid injected at each well;
- (b) a risk assessment statement providing details on identified hazards including their inherent risk, summary of the results from the verification monitoring, preventative measures and the residual risk; and
- (c) a monitoring report outlining the methods and results of verification monitoring undertaken to assess the performance of the injection activities and preventative measures for identified hazards.

Fluid Injection Notification

(B56) The Department of Environment and Science must be notified as soon as reasonably practicable, but within 48 hours of becoming aware of:

- (a) migration of injected fluid out of the target formation; or
- (b) a loss of hydraulic isolation of the target formation; or
- (c) the detection of groundwater contaminants that were not detected in background samples; or
- (d) an injection fluid monitoring result that does not comply with any one of the parameters in *Schedule B: Table 5 - Specific Contaminant Limits for Injection Fluid*.

SCHEDULE C – REGULATED STRUCTURES

Existing Dams and Evaporation Ponds

- (C1) Conditions (C2) to (C7) relate to existing dams and evaporation ponds as identified in *Schedule C: Table 1 – Existing Spring Gully Dams and Evaporation Ponds*.

Schedule C: Table 1 – Existing Spring Gully Dams and Evaporation Ponds

Pond	Maximum Surface Area (Ha)	Volume (ML at Crest Dam Level)	Maximum Operating Depth (m)	Purpose
Pond A Cell 1	5.94	180.5	4.2	Aggregation
Pond A Cell 2	14.4	286	2.07	Aggregation
Pond A Cell 3	22.4	440	2.07	Brine Storage
Pond A Cell 4	21.4	340	2.08	Brine Storage
Pond A Cell 5	19.8	350	2.08	Brine Storage
Talooka Cell 1	4.2	113	3	Aggregation
Talooka Cell 2	2.8	68	3	Evaporation
Talooka Cell 3	2.8	68	3	Evaporation
Strathblane Pond	1.0	19.1	1.42	Aggregation
Pond B	11.6	567.9	7.6	Brine Storage

- (C2) The location and design specifications of any dam or evaporation pond containing hazardous waste must be provided to the administering authority following the completion of the design requirements for each pond, and must include the following:
- (a) latitude and longitude (GDA 94);
 - (b) maximum surface area (ha);
 - (c) maximum volume (ML);
 - (d) maximum depth (m).
- (C3) The holder of this authority must ensure that:
- (a) all dams and evaporation ponds:
 - i. are designed, constructed, operated, maintained and decommissioned in accordance with a design report prepared by a registered professional engineer which has been submitted to and accepted by the administering authority;
 - ii. are operated to maintain a minimum freeboard of 0.5m above the maximum operating level, as determined by a registered professional engineer; and
 - iii. are not located within 100m of any natural drainage feature (i.e. watercourse, waterway, wetland or lake).
 - (b) all dams, evaporation ponds and drill sumps where water is not adequate for livestock, construct

and maintain bunds and/or fences sufficient to exclude livestock;

- (c) all drill sumps are installed and maintained to prevent any discharge through the bed or banks of the sump from causing environmental harm in any waters.

- (C4) The holder of this authority must determine in accordance with Appendix 1, whether the water produced from petroleum activities is a hazardous waste.
- (C5) For high consequence dams containing hazardous waste, the holder of the environmental authority must design, construct, repair, maintain, operate and decommission each dam only in accordance with an acknowledged design plan.
- (C6) Dams and evaporation ponds containing hazardous waste must not be abandoned. They must be decommissioned to a situation where water can no longer be stored and the dams/evaporation ponds and their contained waste(s) are removed or made stable, where after the dams/evaporation ponds are no longer dams/evaporation ponds and they become landforms on the operational land and must comply with the rehabilitation requirements of this environmental authority.
- (C7) The evaporation dams identified in *Schedule C: Table 1 – Existing Spring Gully Dams and Evaporation Ponds* as Talooka Cell 2 and Talooka Cell 3 must be decommissioned or converted to aggregation or brine dams by 20 October 2014.

New Regulated Structures

- (C8) Conditions (C9) to (C56) inclusive, refer to regulated structures not constructed prior to 19 July 2012.
- (C9) Evaporation dams are not authorised.
- (C10) This environmental authority does not authorise the use of regulated structures for the purpose of evaporating coal seam gas water.

Assessment of Consequence Category

- (C11) The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures*, as amended from time to time.
- (C12) The consequence assessment required under condition (C11) must occur in any of the following situations:
 - (a) prior to the design and construction of the structure;
 - (b) prior to any change in its purpose or its stored contents;
 - (c) for a structure assessed and certified as a high or significant consequence structure, at least biennially after its construction;

- (d) for an existing low consequence dam, within 120 business days of 19 July 2012.
- (C13) A consequence assessment report and certification must be prepared for any structure assessed and the report may include a consequence assessment for more than one structure.
- (C14) On receipt, one paper copy and one electronic copy of the consequence assessment report and certification must be provided to the administering authority.
- (C15) All certifications must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for Assessing Consequence Categories and Hydraulic Performance of Dams, as amended from time to time.

Construction of Low Consequence Dam to Contain Wetting Front

- (C16) Where a dam is assessed as low consequence, it must be:
 - (a) constructed, operated and maintained in accordance with accepted engineering standards currently appropriate for the purpose for which the dam is intended to be used; and
 - (b) designed with a floor and sides made of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during both its operational life and including any period of decommissioning and rehabilitation.
- (C17) Where a dam is for the first time assessed as significant or high, the dam must meet the conditions required for regulated dams under this environmental authority within 12 months of that assessment.
- (C18) In the event of early signs of loss of structural or hydrological integrity of a low consequence dam:
 - (a) immediate action to prevent or minimise any actual or potential environmental harm must be taken; and
 - (b) any findings and actions taken must be reported in writing to the administering authority within 20 business days of that event.

Monitoring of Low Consequence Dams

- (C19) The condition of all low consequence dams must be monitored for early signs of loss of structural or hydraulic integrity, based on the advice of a suitably qualified and experienced person. The methods of monitoring and frequency of monitoring shall be as assessed by the person who conducts the consequence assessment based on the particular circumstances of each dam.

Design and Construction of a Regulated Structure

- (C20) All regulated structures must be designed by, and constructed under the supervision of a suitably qualified and experienced person in accordance with the requirements of the Manual for Assessing Consequence

Categories and Hydraulic Performance of Structures, as amended from time to time.

(C21) Construction of a regulated structure is prohibited unless:

- (a) a consequence category assessment report and certification has been submitted to the administering authority;
- (b) a suitably qualified and experienced person has been commissioned to prepare a design plan for the structure; and
- (c) the holder of the environmental authority has received the design plan for the structure, together with certification of that plan from the suitably qualified and experienced person, that:
 - i. the design plan is in accordance with the requirements of the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time;
 - ii. the structure is capable of delivering the performance stated in the design plan; and
- (d) when constructed and operated in accordance with the design plan, the structure will be compliant in all respects with conditions (C20) to (C28) of this environmental authority.

(C22) Regulated dams must be designed and constructed to prevent:

- (a) floodwaters from entering the regulated structure from a watercourse or drainage line to the annual exceedance probability specified for determining spillway capacity in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time; and
- (b) wall failure due to erosion by floodwaters arising from the watercourse or drainage line to the annual exceedance probability specified for determining spillway capacity in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time; and
- (c) overtopping as a result of a flood event of the annual exceedance probability specified for determining spillway capacity in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time.

(C23) The design plan for a regulated structure must include, but not necessarily be limited to:

- (a) a design report which provides:
 - i. certification of the design plan;
 - ii. a description of all the documents which constitute the design plan;
 - iii. a statement of:
 - a. the applicable standards including engineering criteria, industry guidelines, relevant legislation and regulatory documents relied upon in preparing the design plan; and
 - b. all relevant facts and data used in preparing the design plan, including any efforts made to obtain necessary facts and data, and any limitations or assumptions to facts and data used in preparing the design plan;
 - c. the consequence category of the structure; and

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- d. the reasoning of the certifying suitably qualified and experienced person as to how the design plan provides the necessary required performance;
 - iv. documentation of hydrological analyses and estimates required to determine all elements of the design including volumes and flow capacities;
 - v. detailed criteria for the design, operation, maintenance and decommissioning of the structure including any assumptions;
 - vi. design, specification and operational rules for any related structures and systems used to prevent failure scenarios;
 - vii. reasoning for how the design plan provides the required performance;
 - viii. details of any other matter which may substantially affect, or is critical to, the design plan; and
 - ix. evidence that the certifier is a suitably qualified and experienced person.
 - (b) drawings showing the lines and dimensions of built structures and land forms associated with the regulated structure;
 - (c) design, specification and operational rules for any related structures and systems used to prevent failure scenarios;
 - (d) a description of any containment systems;
 - (e) an operational plan that includes;
 - i. normal operating procedures and rules;
 - ii. emergency and contingency plans including operating procedures designed to avoid and / or minimise environmental impacts including threats to human life resulting from any overtopping or loss of structural integrity of the structure;
 - (f) a plan for the decommissioning and rehabilitation of the structure at the end of its operational life;
 - (g) details of reports on investigations and studies done in support of the design plan; and
 - (h) any other matter required by the suitably qualified and experienced person.
- (C24) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:
- (a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and
 - (b) construction of the regulated structure is in accordance with the design plan.
- (C25) Where a regulated dam is to be managed as part of an integrated containment system and the design storage allowance volume is to be shared across the integrated containment system, the design and operating rules for the system as a whole must be documented in a system design plan that is certified by a suitably qualified and experienced person.
- (C26) The system design plan must contain:
- (a) the design plans; and

- (b) the 'as constructed' plans; and
- (c) the operational rules for each individual regulated dam that forms part of the integrated system; and
- (d) the standards of serviceability and accessibility of water transfer equipment or structures; and
- (e) the operational rules for the system as a whole.

(C27) All aggregation dams must:

- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and
- (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam.

(C28) All brine dams must:

- (a) be designed with a floor and sides of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during its operational life including any period of decommissioning and rehabilitation; and
- (b) have a system that will detect any passage of the wetting front or entrained contaminants through the floor or sides of the dam; and
- (c) have a system for the collection and proper disposal of any contaminants that move beyond the bounds of the containment system; and
- (d) be constructed with the capacity to continuously remove any leachate from beneath the floor or beyond the sides of the dam.

Operation of a Regulated Structure

(C29) Operation of a regulated structure is prohibited unless:

- (a) one paper copy and one electronic copy of the design plan and certification, and a set of 'as constructed' drawings and specifications has been submitted to the administering authority, together with certification that the structure:
 - i. has been constructed in accordance with the design plan;
 - ii. is capable of delivering the performance stated in the design plan; and
 - iii. is compliant with the relevant conditions of this environmental authority;
- (b) the conditions of this environmental authority relating to the construction of the structure have been met; and
- (c) for regulated dams, the details required under this environmental authority have been entered into a Register of Regulated Dams.

(C30) Each regulated structure must be maintained and operated in a manner that is consistent with the current design plan and the associated certified 'as constructed' drawings for the duration of its operational life

until decommissioned and rehabilitated.

Mandatory Reporting Level

- (C31) The mandatory reporting level must be marked on a regulated dam in such a way that it is clearly visible.
- (C32) On becoming aware that the mandatory reporting level has been reached, action must be taken to prevent or, if unable to prevent, to minimise, any actual or potential environmental harm.

Annual Inspection Report

- (C33) Each regulated structure must be inspected annually by a suitably qualified and experienced person.
- (C34) At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed:
- (a) against the most recent consequence assessment report and design plan;
 - (b) against recommendations contained in previous annual inspections reports;
 - (c) against recognised structure safety deficiency indicators;
 - (d) for changes in circumstances potentially leading to a change in consequence category;
 - (e) for conformance with the relevant conditions of this environmental authority;
 - (f) for conformance with the drawings of the certified design plan;
 - (g) for the adequacy of the available storage in each regulated dam, based on an actual observation(s) taken after 31 May each year but prior to 1 November of that year, of accumulated sediment, state of the containment barrier and the level of liquids in the dam.
- (C35) A suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and including recommended actions to ensure the integrity of the structure.
- (C36) The suitably qualified and experienced person who prepared the annual inspection report must certify that report in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time.
- (C37) Upon receipt of the annual inspection report, the report and its recommendations must be considered and actions taken to ensure that the regulated structure will safely perform its intended function.
- (C38) Within 20 business days of receipt of the annual inspection report, the administering authority must be notified in writing, of the recommendations of the inspection report and the actions to be or that are being taken to ensure the integrity of each regulated structure.

Design Storage Allowance

- (C39) On 1 November of each year, storage must be available in each regulated dam to meet the design storage

allowance estimated for the dam in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time.

- (C40) On becoming aware that the regulated dam will not have the available storage to meet the design storage allowance on 1 November of any year, action must be taken to prevent or, if unable to prevent, to minimise, any actual or potential environmental harm.

Performance review

- (C41) The performance of each regulated dam over the preceding November to May period must be assessed based on actual observations of the available storage in each regulated dam taken prior to 1 July of each year.
- (C42) Action must be taken to modify the water management system if required so that the regulated dam will perform in accordance with the requirements of this authority, for the subsequent November to May period.

Repair requirements

- (C43) Where any passage of the wetting front through the floor or sides of a regulated dam or low consequence dam is detected, action must be taken as soon as practicable to:
- (a) repair the dam to rectify the detected passage of the wetting front or entrained contaminants through the floor or sides of the dam; or
 - (b) decommission and rehabilitate the dam.

Decommissioning

- (C44) Dams must not be abandoned but must be decommissioned such that ongoing environmental harm is prevented.

Transfer arrangements

- (C45) A copy of any reports, documentation and certifications prepared under this environmental authority, including but not limited to any Register of Regulated Dams, consequence assessment, design plan and other supporting documentation, must be provided to a new holder of an environmental authority and the administering authority on transfer of the environmental authority.

Register of Regulated Dams

- (C46) A register of regulated dams must be established and maintained which must include, but not necessarily be limited to, the following information for each regulated dam:
- (a) date of entry in the register;
 - (b) name of the dam, its purpose and intended / actual contents;

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- (c) location of the dam defined by coordinates (GDA94) within five metres at any point from the outside of the dam including its storage area;
 - (d) the consequence category of the dam as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, as amended from time to time;
 - (e) dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;
 - (f) name and qualifications of the certifier of the design plan and 'as constructed' drawings;
 - (g) for the regulated dam, other than in relation to any levees:
 - i. dimensions (metres) and surface area (hectares) of the dam measured at the foot print of the dam;
 - ii. dam crest volume (megalitres);
 - iii. spillway crest level (metres AHD);
 - iv. maximum operating level (metres AHD);
 - v. storage rating table of stored volume versus level (metres AHD);
 - vi. design storage allowance (megalitres) and associated level of the dam (meters AHD);
 - vii. mandatory reporting level (metres AHD);
 - (h) design plan title and reference relevant to the dam;
 - (i) date construction was certified as compliant with the design plan;
 - (j) name and qualifications of certifier;
 - (k) details of the composition and construction of any liner;
 - (l) the system for the detection of any leakage through the floor and sides of the dam;
 - (m) dates when the dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;
 - (n) dates when the dam was inspected for the detection of leakage through the liner;
 - (o) dates when the dam was inspected for the purpose of annually ascertaining the available storage capacity;
 - (p) dates when recommendations and actions in the annual inspection report were provided to the administering authority; and
 - (q) dam water quality as obtained from monitoring required under conditions (C52) - (C54).

(C47) The required information in the register of regulated dams must be provisionally entered when a design plan for a regulated dam is submitted to the administering authority.

(C48) A final entry of the required information in the register of regulated dams must be made once compliance with condition (C29) has been achieved.

(C49) The information contained in the register of regulated dams must always be current and complete on any given day.

(C50) All entries in the register of regulated dams must be approved by the chief executive officer for the holder

of this environmental authority, or their delegate, as being accurate and correct.

- (C51) A copy of the records contained in the Register of Regulated Dams in the electronic format required by the administering authority must be provided with the annual return.

Annual Regulated Dam Water Quality Monitoring

- (C52) The quality of water in all regulated dams on the relevant resource authority(ies) must be monitored in the month of October every year.
- (C53) The monitoring of regulated dam water must include sufficient analytes and physico-chemical parameters to characterise water quality in the dam and must include, but not necessarily be limited to:
- (a) pH;
 - (b) electrical conductivity [$\mu\text{S/m}$];
 - (c) anions (bicarbonate, carbonate, chloride, sulphate) [mg/L];
 - (d) cations (calcium, magnesium, potassium, sodium) [mg/L];
- (C54) Water quality samples of regulated dams must be taken from at least three different dam profile depths for each sampling event and be taken as far as practicable from the edge of the regulated dam.

Infrastructure

- (C55) All infrastructure constructed by or for the holder of this authority must be decommissioned and the site rehabilitated according to Conditions (I1) to (I17) inclusive prior to surrender of the environmental authority.
- (C56) Where infrastructure is to remain after the surrender of this authority, the holder must obtain the written agreement of the administering authority and the current land owner/holder.

SCHEDULE D – LAND**Preventing Contaminant Release to Land**

- (D1) Contaminants must not be released to land other than as specified in Schedule D.
- (D2) Associated water may be used for dust suppression during construction activities provided the activity is carried out to avoid causing environmental harm.

Treated Sewage – Land Disposal (Less than 21 EP)

- (D3) Treated sewage effluent may only be released to land by irrigation at designated, fenced contaminant release area(s).
- (D4) The release of contaminants to land authorised under this environmental authority must be carried out in a manner such that:
- (a) vegetation is not damaged;
 - (b) soil quality is not adversely impacted;
 - (c) there is no surface ponding or runoff to waters;
 - (d) there is no aerosols or odours;
 - (e) deep drainage below the root zone of any vegetation is minimised;
 - (f) the quality of shallow aquifers is not adversely affected.

Treated Sewage Effluent Dust Suppression or Construction Activities

- (D5) Notwithstanding conditions (D3) and (D4), treated sewage effluent that meets or exceeds the standards specified in *Schedule D: Table 1 – Release Limits - Land* may be used for dust suppression or construction activities, provided the use meets the criteria in conditions (*new condition inserted below*), as relevant to the use.
- (D6) The release of treated sewage effluent under condition (D5) must:
- (a) not exceed the amount required to effectively suppress dust; and
 - (b) not cause on-site ponding or runoff; and
 - (c) be directly applied to the area being dust suppressed; and
 - (d) not harm vegetation surrounding the area the subject of condition (D5).

Treated Sewage – Land Disposal (Between >21 EP and <150 EP)

- (D7) Treated sewage effluent or greywater can be released to land provided it:
- (a) meets or exceeds secondary treated class C standards for a treatment system with a daily peak design capacity of between 21 and 150EP.
- (D8) The release of sewage effluent or greywater authorised in condition D7 must:

- (a) be to a fenced and signed contaminant release area(s)
- (b) not result in pooling or run-off or aerosols or spray drift or vegetation die-off
- (c) be to a contaminant release area(s) that is kept vegetated with groundcover, that is
 - i. not a declared pest species;
 - ii. kept in a viable state for transpiration and nutrient uptake; and
 - iii. grazed or harvested and removed from the contaminant release area as needed, but not less than every 3 months.

Treated Sewage – Land Disposal (Greater than 150 EP)

- (D9) Contaminants permitted to be discharged to land include (a) treated sewage, and (b) treated water and stormwater treated in the Wetland Treatment Systems. Treated sewage must be irrigated to the designated irrigation areas in compliance with the treated sewage quality limits stated in *Schedule D: Table 1 – Release Limits - Land* and the conditions of this authority.

Schedule D: Table 1 – Release Limits - Land

Discharge Type and Location	Monitoring Point	Quality Characteristics	Release Limit		Monitoring Frequency
			Concentration	Limit Type	
Treated sewage discharged to irrigation areas	Outlet of storage tank	pH	6.5 – 9.0	Range	Monthly
		Faecal Coliforms (organisms/ 100ml)	10 000 cfu /100 mL	Mean	Monthly
		Total Dissolved Solids (TDS)	1 000mg/L	Mean	Monthly
Treated process waters and stormwater discharged to irrigation areas	Outlet of wetlands	pH	6.5 – 9.0	Range	Monthly
		Total Dissolved Solids (TDS)	1 000mg/L	Mean	Monthly
Treated effluent for use in dust suppression or construction activities	Outlet of storage tank	5-day biochemical oxygen demand (inhibited)	20 mg/L	maximum	Monthly
		pH	6.0 to 8.5	range	
		e-Coli (used for dust suppression or construction activities)	100 cfu per 100 mL	80 th percentile based on at least 5 samples with not less than 30 minutes between samples.	
			1000 cfu per 100 mL	maximum	

Monitoring

- (D10) Monitoring must be undertaken and records kept of contaminant releases to land from the discharge

locations for the parameters and not less frequently than specified in *Schedule D: Table 1 – Release Limits - Land*. All determinations of the quality of contaminants released must be:

- (a) made in accordance with methods prescribed in the latest edition of the latest edition of the Queensland Monitoring and Sampling Manual as amended from time to time; and
- (b) carried out on samples that are representative of the discharge.

(D11) The holder of this authority must:

- (a) develop a Wetland Treatment System monitoring program to assess the performance and sustainability of the Wetland Treatment System to meet the criteria prescribed in condition (D6); and
- (b) report the results and analysis of the monitoring program to the administering authority:
 - i. when any significant changes are detected; and
 - ii. upon request by the administering authority;

(D12) The discharge of treated wastewater to irrigation areas must be carried out in a manner that avoids runoff and contribution to deep drainage of more than an average of 10mm/day, and where:

- (a) category A and category B sensitive ecosystems are not impacted;
- (b) saline and sodic scalds do not form;
- (c) soil erosion and soil structure degradation is not different from surrounding local region (<5km);
- (d) an irrigation plan includes a water balance to incorporate climatic and seasonal variations;
- (e) the capacity of the land and ground waters to receive nitrogen, phosphorus, salts, metals, organic matter as measured by oxygen demand and water is not exceeded and monitoring results are recorded and kept on file to be inspected by the administering authority upon request and is used as a baseline for comparisons in future monitoring reports;

(D13) The discharge of treated sewage to irrigation areas must be carried out in accordance with the criteria for Class D recycled water in the Queensland Water Recycling Guidelines dated December 2005 or subsequent versions thereof.

(D14) When conditions prevent the absorption of treated wastewater to land (such as during rain events), alternative measures must be taken to store/dispose of the wastewater (such as wet weather storage or tankering off site). There must not be any release of treated wastewater from any wet weather storage to any waters or storm water drain.

Land Management

(D15) The holder of this authority must:

- (a) minimise disturbance to land in order to prevent land degradation;
- (b) manage topsoil in a manner that will preserve its biological and chemical properties; and
- (c) utilise stockpiled soils for rehabilitation purposes;

Storage and Handling of Flammable and Combustible Liquids

- (D16) The holder of this authority must ensure that any spillage of all flammable and combustible liquids will be controlled in a manner that prevents environmental harm (other than trivial harm) and that on site containment is installed and maintained in accordance with Section 5.9 of AS 1940 - Storage and Handling of Flammable and Combustible Liquids.
- (D17) The holder of this authority must ensure that all flammable and combustible liquids are stored and handled in accordance with AS 1940.

Pipeline Activities

- (D18) The holder of this authority must undertake activities in accordance with the AS 2885 for pipeline assets that are specified within the standard.
- (D19) All records of maintenance and monitoring of pipelines must be kept on file and provided upon request of the administering authority.

Hydrostatic Test Water and Low Point Drains

- (D20) Hydrostatic test water from pipelines and coal seam gas water from low point drains may be released to land provided that it:
- meets the limits specified in *Schedule D: Table 2 – Limits for the release of Hydrostatic Test Water from Pipelines and Coal Seam Gas Water from Low Point Drains to Land* for each of the water quality characteristics;
 - each release location for hydrostatic test water is at least 100 metres from the nearest watercourse.

Schedule D: Table 2 – Limits for the release of Hydrostatic Test Water from Pipelines and Coal Seam Gas Water from Low Point Drains to Land

Parameter	Maximum Value
pH	6.5-8.5 (Range)
Aluminium (mg/L)	20
Arsenic (mg/L)	2.0
Boron (mg/L)	0.5
Cadmium (mg/L)	0.05
Chromium (mg/L)	1
Chloride (mg/L)	800
Copper (mg/L)	5
Iron (mg/L)	10
Fluoride	2
Lead (mg/L)	5

Parameter	Maximum Value
Manganese	10
Mercury	0.002
Nickel	2
Selenium	0.05
Silver	5.0
Total Petroleum Hydrocarbons	10
Vanadium	0.5
Zinc (mg/L)	5
Nitrogen (mg/L)	35
Phosphorus (mg/L)	10
Electrical Conductivity ($\mu\text{S}/\text{cm}$)	2900

SCHEDULE E – DISTURBANCE TO LAND**Environmentally Sensitive Areas**

- (E1) Notwithstanding any other condition of this authority, the holder of this authority must ensure that petroleum activities:
- (a) are not conducted within a category A or category B Environmentally Sensitive Area (ESA); and
 - (b) do not cause a significant disturbance within 1km of a category A ESA or within 500m of a category B ESA; and
 - (c) are not conducted in a category C ESA unless there is a written agreement to enter the area for those activities from the relevant administering authority.
- (E2) Prior to carrying out field based activities, the holder of the environmental authority should make all relevant staff, contractors or agents carrying out those activities, aware of the location of any category A, category B or category C Environmentally Sensitive Areas within area of the proposed activity.
- (E3) Despite condition (E1), where no reasonable alternative exists, petroleum activities may be undertaken within an endangered regional ecosystem or the 500m buffer zone of an endangered regional ecosystem, provided that those activities are located according to the following order of preference:
- (a) pre-existing areas of significant disturbance within the buffer zone;
 - (b) undisturbed areas more than 100m from the ESA;
 - (c) undisturbed areas less than 100m from the ESA;
 - (d) pre-existing areas of significant disturbance within the ESA;
 - (e) areas within the ESA of lower environmental value (e.g. not of concern remnant vegetation or of concern remnant vegetation in a polygon mapped as containing endangered regional ecosystem and other ecosystems); and
 - (f) areas where clearing of an endangered regional ecosystem is unavoidable provided the clearing does not exceed 10% of a polygon mapped as an endangered regional ecosystem and all reasonable effort is made to minimise the area cleared and to avoid clearing mature trees.
- (E4) Condition (E3) does not authorise clearing that is:
- (a) more than 10% of a polygon mapped as an endangered regional ecosystem;
 - (b) more than 3600m² for the operational area for any drill site within an endangered regional ecosystem;
 - (c) within an endangered regional ecosystem for construction of a sump larger than 30m²;
 - (d) greater than 6 metres in width for tracks that are necessary within an endangered regional ecosystem for production and exploration purposes; and
 - (e) greater than 12 metres in width for pipeline construction purposes that is necessary within an endangered regional ecosystem.

- (E5) Despite conditions (E1), (E3) and (E4) petroleum activities listed in *Schedule E: Table 1 - Permitted Activities within 500 m of a Category B ESA 1* are permitted within 500 metres of a category B ESA.

Schedule E: Table 1 – Permitted Activities within 500 m of a Category B ESA

Petroleum Activity	Latitude	Longitude	Maximum Disturbance (ha)
Spring Gully Gas Plant Detention Pond	-25.94546	149.06223	0.29
	-25.94513	149.06249	
	-25.94537	149.06285	
	-25.94569	149.06259	

- (E6) Despite condition (E4), the activities listed in *Schedule E: Table 2 – Permitted Activities within Endangered Regional Ecosystems*, are permitted:

- within the geographical bounds identified in Schedule E: Table 2; and
- within the maximum disturbance limit identified in Schedule E: Table 2.

Schedule E: Table 2 – Permitted Activities within Endangered Regional Ecosystems.

Permitted activity	Geographical bounds		Maximum disturbance	Environmental offset required
	Latitude	Longitude		
Access track to Eurombah Creek Gas Processing Facility (GPF)	-25.911113	149.117426	0.30 ha	Yes
	-25.911365	149.117157		
	-25.911799	149.116994		
	-25.912327	149.116953		
	-25.912292	149.116660		
	-25.911747	149.116701		
	-25.911285	149.116857		
	-25.911110	149.116992		
	-25.910931	149.117194		
	-25.913689	149.197225	0.10 ha	Yes
	-25.913741	149.197519		
	-25.913904	149.197421		
	-25.914197	149.197409		
	-25.914145	149.197115		
	-25.913849	149.197120		
	-25.914506	149.197494		
	-25.915820	149.197782		
	-25.915881	149.197490		
	-25.914567	149.197203		
Access track ATP294	-25.87473753	148.9616210	0.20ha	No
	-25.87473967	148.9616583		

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Permitted activity	Geographical bounds		Maximum disturbance	Environmental offset required
	Latitude	Longitude		
	-25.87358419 -25.87362368 -25.87473072 -25.87473365 -25.87348841 -25.87352652	148.9624508 148.9624581 148.9615021 148.9615532 148.9623980 148.9624209		
Flowline RoW DMR300-4 including associated access track	-25.87212078 -25.87213223 -25.87284882 -25.87298491 -25.87287691 -25.87299549 -25.87318249 -25.87317841 -25.87362258 -25.87362655 -25.87389244 -25.87186760 -25.87190956 -25.87281902 -25.87278626 -25.87295387 -25.87294510 -25.87322940 -25.87319449 -25.87372116 -25.87373236 -25.87441189 -25.87451566	148.9833398 148.9833618 148.9844643 148.9845753 148.9844288 148.9845296 148.9846282 148.9845965 148.9847821 148.9847690 148.9849612 148.9826783 148.9826716 148.9839755 148.9840059 148.9842291 148.9842354 148.9843863 148.9844164 148.9846228 148.9846127 148.9851223 148.9851343	0.20ha	No
Access track AT20	-25.913698 -25.912318	148.965339 148.968930	0.50ha	No
Extra Work Space (EWS428)	-25.878 to - 25.879	148.952 to 148.955	0.097ha	No
Extra Work Space	-25.878 to - 25.879	148.952 to 148.955	0.099ha	No

Environmental authority EPPG00885313

Permitted activity	Geographical bounds		Maximum disturbance	Environmental offset required
	Latitude	Longitude		
(EWS429)				

- (E7) Activities that impact upon State Significant Biodiversity Values may only be undertaken within PL414, PL415, PL416, PL418, PL419 or the Endangered Regional Ecosystems identified in Schedule E: Table 2, if the holder has:
- (a) submitted a Site Based Offset Plan for State Significant Biodiversity Values:
 - i. for Endangered Regional Ecosystems identified in *Schedule E: Table 2 - Permitted Activities within Endangered Regional Ecosystems*, within 12 months of commencing activities in those Endangered Regional Ecosystems; and
 - ii. for all other areas identified in condition (E7), prior to commencing activities in those areas;
 - (b) received written confirmation from the administering authority that the submitted Site Based Offset Plans have been accepted by the administering authority; and
 - (c) recorded, following written confirmation from the administering authority:
 - i. the impacts to State Significant Biodiversity Values that will occur as a result of the undertaken activities; and
 - ii. the offsets for those impacts.
- (E8) Offsets required by condition (E7) must be provided in accordance with the Queensland Biodiversity Offset Policy or latest policy thereof.
- (E9) A Site Based Offset Plan accepted under Condition (E7)(b) must be implemented.
- (E10) Where a financial payment is the selected method of offset delivery, payment must be made as directed by the administering authority within 40 business days.
- (E11) Impacts to prescribed environmental matters, other than by low impact activities or if the impacts were authorised by an existing authority before the commencement of the *Environmental Offsets Act 2014*, must be in accordance with the *Environmental Offsets Act 2014*.

SCHEDULE F – ENVIRONMENTAL NUISANCE**Noise**

- (F1) The holder of this authority must ensure that petroleum activities do not cause environmental nuisance at any sensitive or commercial place.

Nuisance monitoring

- (F2) When the administering authority advises of a complaint alleging nuisance, the holder must investigate the complaint as soon as practicable. The investigation is to include monitoring of environmental nuisance at any sensitive place within a reasonable and practical timeframe.
- (F3) The administering authority must be advised in writing of the results of the investigation (including an analysis and interpretation of the monitoring results) and actions proposed or undertaken to resolve the complaint within five business days of completing the complaint investigation, unless a longer time is agreed to in writing by the administering authority.
- (F4) If the investigation or monitoring in accordance with condition (F2) indicates that emissions exceed the limits set in this environmental authority or are causing environmental nuisance, then:
- (a) the complaint must be addressed including the use of alternative dispute resolution services if required; and / or
 - (b) abatement or attenuation measures must be implemented so that the authorised petroleum activity(ies) does not result in further environmental nuisance.
- (F5) Noise monitoring and recording required under this environmental authority must include, but not necessarily be limited to:
- (a) LAN,T (where N equals the statistical levels of 1, 10 and 90 and T=15 mins);
 - (b) LAeq adj, 15 mins;
 - (c) background noise level as LA 90, 15 mins;
 - (d) Max LpA, 15 mins;
 - (e) the level and frequency of occurrence of impulsive or tonal noise and any adjustment and penalties to measured noise levels;
 - (f) atmospheric conditions including temperature, relative humidity and wind speed and directions;
 - (g) effects due to any extraneous factors such as traffic noise;
 - (h) location, date and time of monitoring;
 - (i) if the complaint concerns low frequency noise, Max LpZ, 15 mins; and
 - (j) if the complaint concerns low frequency noise, one third octave band measurements in dB(LIN) for centre frequencies in the 10 – 200 Hz range for both the noise source and the background noise in the absence of the noise source.

- (F6) A Noise Management Plan must be developed prior to 31 May 2013 for petroleum activities authorised by this environmental authority.
- (F7) The Noise Management Plan must include, but not necessarily be limited to:
- (a) commitment by the Chief Executive Officer for the holder of this environmental authority, or their delegate, to ensure adequate allocation of staff and resources to the establishment and operation of the Noise Management Plan;
 - (b) definition of roles, responsibilities and authorities within the staffing of the Noise Management Plan;
 - (c) delivery of training to staff and contractors and maintenance of competencies;
 - (d) risk / constraint analysis methods to be undertaken prior to any new operation (e.g. drill site) or installation of new equipment that has the potential to create noise nuisance;
 - (e) procedures and methods to undertake assessments to determine compliance with the noise limits in *Schedule F: Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint being received and when there are no alternative arrangements in place, taking in to account any tonal or impulsive noise impacts;
 - (f) procedures for handling noise complaints;
 - (g) community liaison and consultation procedures including but not limited to consultation for when night time petroleum activities (i.e. between 10:00 pm and 6:00 am) are likely to exceed 25 dBA;
 - (h) procedures for managing records associated with all aspects of the Noise Management Plan including standardised forms for recording monitoring results and complaints;
 - (i) details of petroleum activities and measured and / or predicted noise levels of noise sources associated with those activities;
 - (j) reasonable and practicable control or abatement measures (including relocating the activity, altering the hours of operation, or having an alternate arrangement in place with any potentially affected person) that can be undertaken to ensure compliance with the noise limits in *Schedule F: Table 1 – Noise limits at Sensitive Receptors*;
 - (k) the level of noise at sensitive receptors that would be achieved from implementing the measures detailed under condition (F7)(j); and
 - (l) mediation processes to be used in the event that noise complaints are not able to be resolved.
- (F8) Prior to undertaking petroleum activities that will result in short-term, medium-term or long term noise events that are likely to impact on a sensitive receptor, any potential noise emissions from the relevant petroleum activity(ies) must be modelled and calculated to demonstrate that noise emissions will not exceed the noise levels specified in *Schedule F: Table 1 – Noise limits at Sensitive Receptors*.
- (F9) The emission of noise from the petroleum activity(ies) authorised under this environmental authority must not result in levels greater than those specified in *Schedule F: Table 1 – Noise limits at Sensitive Receptors* in the event of a valid complaint about noise being made to the administering authority.

Schedule F: Table 1 – Measured Noise Limits at Sensitive Receptors

Time Period	Metric	Short Term Noise Event	Medium Term Noise Event	Long Term Noise Event
7:00 am – 6:00 pm	$L_{Aeq,adj,15\ min}$	45 dBA	43 dBA	40 dBA
		Measured noise levels outside a sensitive receptor		
6:00 pm – 10:00 pm	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
		Measured noise levels outside a sensitive receptor		
Noise from drilling activities undertaken from 10:00pm – 7:00am	$L_{Aeq,adj,15\ min}$	30 dBA Measured noise levels indoors a sensitive receptor		
Noise from fixed plant in gas fields undertaken from 10:00pm – 7:00am	$L_{Aeq,adj,15\ min}$	28 dBA Measured noise levels indoors a sensitive receptor		
10:00 pm – 6:00 am	Max $L_{pA, 15\ mins}$	55 dBA Measured noise levels outside a sensitive receptor		

Note: L_{ABG} is the deemed background noise levels which for the purposes of Schedule E: Table 1 Measured Noise Limits at Sensitive Receptors are:

7:00 am - 6:00 pm: 35 dBA

6:00 pm – 10:00 pm: 30 dBA

10:00 pm – 6:00 am: 25 dBA

6:00 am – 7:00 am: 30 dBA

(F10) If the noise subject to a complaint is tonal or impulsive, the adjustments detailed in *Schedule F: Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors* are to be added to the measured noise level(s) to derive $L_{Aeq, adj, 15\ min}$.

Schedule F: Table 2 – Adjustments to be Added to Noise Levels at Sensitive Receptors

Noise Characteristic	Adjustment to Noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is just audible	+ 2 dBA
Impulsive characteristic is clearly audibly	+ 5 dBA

(F11) Where alternative arrangements are in place with an affected person(s) at a sensitive receptor as referred to by condition (F7)(j), the noise limits in *Schedule F: Table 1 – Noise limits at Sensitive Receptors* do not apply at that sensitive receptor for the duration for which the alternative arrangements are in place.

Low Frequency Noise

(F12) Notwithstanding condition (F9), emission of any low frequency noise must not exceed the following limits in the event of a valid complaint about low frequency noise being made to the administering authority:

- 60 dB(C) measured outside the sensitive receptor; and
- the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
- 50 dB(Z) measured inside the sensitive receptor; and

- (d) the difference between the internal A-weighted and Z-weighted noise levels is no greater than 15 dB.

Vibration and Blasting

- (F13) A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.
- (F14) Noise from blasting operations must not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive receptor.
- (F15) Ground-borne vibration peak particle velocity caused by blasting operations must not exceed 10 mm/s at any time, when measured at or extrapolated to any sensitive receptor.

Blast and Vibration Monitoring

- (F16) Monitoring and recording of the air blast overpressure and ground borne vibration of every blast must be undertaken.
- (F17) Blast and vibration monitoring must include but not necessarily be limited to:
 - (a) maximum instantaneous charge;
 - (b) location of the blast within the site (including any bench level);
 - (c) airblast overpressure level (dB Linear Peak);
 - (d) peak particle velocity (mm / s);
 - (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) distances from the blast site to potentially noise-affected buildings or structures.

Dust and Particulate Matter Monitoring – Concrete Batching Activities

- (F18) For the purposes of monitoring in accordance with condition (F2), dust and particulate matter from concrete batching activities must not exceed the following levels at any sensitive or commercial place, when monitored in accordance with Australian Standard AS3580.10.1 of 2003 (or more recent versions):
 - (a) dust deposition of 120mg/m²/day;
 - (b) PM₁₀ concentration of 50µg/m³ over a 24 hour averaging time;
 - (c) PM_{2.5} concentration of 25µg/m³ over a 24 hour averaging time.

SCHEDULE G – AIR

Fuel Burning

- (G1) This authority only permits the burning of liquid and gaseous-based hydrocarbon fuels in fuel burning equipment.

SCHEDULE H – WASTE

General Waste management

- (H1) Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.
- (H2) Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised to be disposed of or used on site under this environmental authority.
- (H3) Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material or drilling fluids stored in sumps, must be contained in either:
 - (a) an above ground container; or
 - (b) a structure which contains the wetting front.
- (H4) Green waste may be used on-site for either rehabilitation or sediment and erosion control, or both.
- (H5) Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.

Residual drilling material

- (H6) If sumps are used to store residual drilling material or drilling by-product, they must only be used for the duration of drilling activities.
- (H7) Residual drilling material can only be disposed of on-site by the mix-bury cover method if the residual drilling material meets the approved quality criteria.
- (H8) Residual drilling material or drilling by-products may be disposed of on-site if the method is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.
- (H9) Records must be kept to demonstrate compliance with condition (H6), (H7) and (H8).

Produced water use

- (H10) Produced water may be re-used in:
 - (a) drilling and well hole activities; or
 - (b) stimulation activities.

(H11) Produced water from the authorised petroleum activity(ies) may be used for irrigation, dust suppression, construction, operational and incidental land management purposes for the petroleum activity(ies) authorised by this environmental authority. The use of produced water must not cause:

- (a) on-site ponding;
- (b) runoff from the site where the resource is applied;
- (c) vegetation die-off;
- (d) visible salting; or
- (e) serious or material environmental harm.

(H12) Produced water from the authorised petroleum activity(ies) which is used for:

- (a) domestic, stock or stock intensive purposes must meet the ANZECC and ARMCANZ Water Quality Guidelines 2000 for stock and domestic purposes, as amended from time to time;
- (b) irrigation purposes must meet the ANZECC and ARMCANZ Water Quality Guidelines 2000 for irrigation purpose, as amended from time to time

Produced water – Third party use

(H13) Produced water may be transferred to a third party to be used off tenure for the following purposes:

- (a) Dust suppression, construction, operational and incidental land management purposes;
- (b) livestock watering purposes; and
- (c) irrigation purposes.

(H14) If the responsibility of produced water is given or transferred to a third party for use off tenure, the holder of environmental authority must ensure that:

- (a) the water meets the relevant quality guidelines for the intended purpose prior to the water being given;
- (b) the responsibility of the produced water is given or transferred in accordance with a written agreement (the third party agreement) signed by both parties to the agreement; and
- (c) the third party is made aware of the General Environmental Duty (GED) under s. 319 of the *Environmental Protection Act 1994*, environmental sustainability of the water disposal and protection of environmental values of waters.

(H15) If the produced water is being given or transferred via a continuous transfer process i.e. pipeline, the holder of the environmental authority must ensure that the water meets the relevant quality guidelines for the intended purpose prior to the water being given on:

- (a) initial transfer of the water; and
- (b) thereafter monthly.

Written agreement details

(H16) The written agreement as per condition (H13) must include the following in writing:

- (a) the intended use of the water;
- (b) confirmation that the water meets ANZECC and ARMCANZ Water Quality Guidelines for the approved use;

- (c) confirmation that the produced water being provided is compliant with the environmental authority conditions; and
- (d) a current and complete laboratory certificate of analysis that outlines the quality of the produced water as per the ANZECC and ARMCANZ Water Quality Guidelines

(H17) The holder of this environmental authority must cease using, selling or giving away produced water immediately upon becoming aware that:

- (a) the water does not meet the water ANZECC and ARMCANZ Water Quality Guidelines for the approved use at or before the point of supply; or\
- (b) the water does not meet the water ANZECC and ARMCANZ Water Quality Guidelines for the approved use at the point in which it is used by a third party.

(H18) When the produced water is transferred to a third party, the holder of the environmental authority must retain the following records of the resource:

- (a) origin of the produced water;
- (b) intent of the water;
- (c) date of dispatch of the produced water;
- (d) location of delivery of the produced water to the third party user by real property description;
- (e) date of delivery of the produced water to the third party;
- (f) contact details for the person responsible for the use of the produced water at the site of use;
- (g) quantity (volume) of the produced water supplied;
- (h) relating to sampling and monitoring including: laboratory results, field data and monitoring report; and
- (i) any written procedures developed to manage the produced water.

(H19) Upon written agreement, the administering authority must be notified with the following details:

- (a) the person responsible for the use of the produced water;
- (b) the location of use of the produced water; and
- (c) the intended use of the produced water.

SCHEDULE I – REHABILITATION

- (11) All significantly disturbed land caused by the carrying out of the petroleum activity(ies) must be rehabilitated to meet the following final acceptance criteria:
- (a) For all land use(s):
- i. all significantly disturbed land is reinstated to the pre-disturbed soil suitability class;
 - ii. the landform is safe for humans and fauna;
 - iii. the landform is stable with no subsidence or erosion gullies for at least three years;
 - iv. all significantly disturbed land is reinstated so that the distribution of vegetation communities represents the analogue site;
 - v. the water quality of any residual void or water bodies constructed by the petroleum activity(ies) meets criteria for subsequent uses and does not have potential to cause environmental harm;
 - vi. there is no ongoing contamination to waters;
 - vii. there is no ongoing contamination to groundwater from dams or monocells (demonstrated via groundwater monitoring and leak detection monitoring systems); and
 - viii. the maintenance requirements for rehabilitated land is no greater than that required for the land prior to its disturbance caused by carrying out the petroleum activity(ies).
- (b) Additional requirements for sites that are being reinstated to native ecosystems:
- i. each vegetation community must be re-established so that each of the following rehabilitation parameters are maintained for at least three years;
 - ii. the rehabilitated site shows distinct and progressive re-establishment of the various strata which characterise the vegetation community in the analogue site;
 - iii. all dominant species within each strata are re-established at densities equivalent to that of the analogue site;
 - iv. notwithstanding conditions (11)(b)(i) and (11)(b)(ii), a minimum of 70% species richness and species diversity is observed when compared to the relevant analogue site;
 - v. a minimum of 50% foliage cover is observed when compared to the relevant analogue site;
 - vi. each vegetation community must be rehabilitated and maintained until it can be demonstrated that it is resilient and self-sustaining (demonstrated by reproduction and colonisation); and
 - vii. percent organic litter cover, count and density of hollow bearing logs and nest boxes (as replacement for trees with hollows $\geq 10\text{cm}$ diameter) and fallen woody material (total length of logs $\geq 10\text{ cm}$ diameter per hectare and number of logs $\geq 10\text{cm}$ per hectare) have been installed at numbers and densities no lower than the analogue site.

Rehabilitation Plan

- (12) A Rehabilitation Plan which has been certified by a suitably qualified person must be developed three months after the date of grant of this environmental authority.

- (13) The Rehabilitation Plan must include strategies for the determination of final land use(s) and rehabilitation goals and details of how rehabilitation objectives will be achieved and will be able to be measured against the progressive and final rehabilitation criteria in this environmental authority. The Rehabilitation Plan must include:
- (a) a rehabilitation hierarchy for:
 - i. reinstating a native ecosystem as similar as possible to the original ecosystem as the preferred option; then
 - ii. establishing an alternative outcome with a higher environmental value than the previous land use; then
 - iii. reinstating the previous land use (e.g. grazing or cropping); and
 - (b) methods to achieve rehabilitation goals including, but not necessarily being limited to:
 - i. establishing final land use(s) in consultation with affected landholder(s) and the administering authority;
 - ii. identifying suitable analogue¹ sites to measure rehabilitation success that may either be the pre-disturbed area or another area that has equivalent values and characteristics as the intended final land use(s); and
 - iii. for sites that are being reinstated to a land use other than a native ecosystem, the Rehabilitation Plan must identify any additional and relevant indicators to be measured at both the analogue and rehabilitation site(s) so as to assess progressive and final rehabilitation success for that land use;
 - iv. for sites that are being reinstated to native ecosystems and the analogue site is the pre-disturbed site, the Rehabilitation Plan must include indicators that, as a minimum include:
 - a. baseline soils quality data and maps for the soil units to be disturbed;
 - b. identification of the vegetation communities present (including species composition and regional ecosystem type² for native vegetation communities) within each area(s) to be disturbed;
 - c. data representing each vegetation community present within each area(s) to be rehabilitated including:
 - aa. flora species richness and diversity;
 - ab. structural data including woody stem count densities for dominant species within each stratum; and
 - ac. percent foliage cover (accounting for seasonal variation and excluding pests);
 - d. data regarding habitat features, including but not necessarily limited to:
 - aa. organic litter cover (%); and
 - ab. trees with hollows $\geq 10\text{cm}$ diameter (count and number per hectare);

¹ The latest version of the Qld Government's "*Biocondition, a Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual*" and accompanying document "*Methodology for the Establishment and Survey of Reference Sites for Biocondition*" may be used to establish suitable analogue sites for like native vegetation communities.

² Regional ecosystem type should be established using the most current version of the Qld Government's "*Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*". Assessment of the vegetation communities should be sufficient to establish any inherent variation within a single regional ecosystem type.

- ac. hollow bearing logs (count and number per hectare); and
- ad. fallen woody material (total length of logs ≥ 10 cm diameter per hectare and number of logs ≥ 10 cm diameter per hectare); and
- e. a map or series of maps of suitable scale displaying the distribution of vegetation communities.
- v. identification of any land use constraints which have resulted from the petroleum activity(ies);
- vi. residual pollution risks with strategies for managing and mitigating them;
- vii. landscape planning and landform design principles to achieve stable landforms including slope designs, erosion controls and drainage lines;
- viii. integrating rehabilitated areas so they are compatible with the surrounding landscape, including linking rehabilitated areas of native vegetation with undisturbed native vegetation to provide larger areas and wildlife corridors where feasible;
- ix. ensuring that significantly disturbed areas are rehabilitated progressively and that the progressive rehabilitation criteria are routinely measured;
- x. site preparation such as re-profiling, re-instating surface drainage systems;
- xi. top soil management such as top soil handling and stockpiling to preserve soil fertility and biota, respreading techniques, planned thickness, ripping, top soil treatments / amendments and mulching in consideration of analogue data;
- xii. flora to be established, including required species diversity, abundance and composition and projective cover in consideration of analogue data;
- xiii. plant propagation and / or supply methods including using seeds / spores of local provenance where feasible;
- xiv. establishment methods to maximise rehabilitation success such as seed treatments, seed spreading, timing of seeding to suit best local climatic conditions, hydroseeding, transplanting;
- xv. weed control;
- xvi. sourcing habitat structures for native fauna and installation methods in consideration of matching analogue data;
- xvii. ongoing maintenance program for rehabilitated areas; and
- xviii. rehabilitation monitoring program as required by conditions 0 and 0 of this environmental authority; and
- (c) timeframes for commencing rehabilitation of significantly disturbed areas that are not required for the ongoing conduct of the petroleum activity(ies), not greater than three months for the rehabilitation of buried pipelines and not greater than nine months for any other significantly disturbed area.

- (14) The Rehabilitation Plan must be implemented.

Progressive Rehabilitation for Significantly Disturbed Land

- (15) Pipelines trenches must be backfilled immediately after pipe laying and rehabilitated commenced as soon

as practicable but not longer than three months after backfilling has been completed.

- (16) During backfilling of pipeline trenches, soils must be replaced so that the soil horizons are consistent with the soil horizons of the immediately surrounding area.
- (17) Backfilled and rehabilitated pipeline trenches must:
- (a) be a stable landform;
 - (b) exhibit no subsidence or erosion gullies for the life of the operational pipeline; and
 - (c) be re-profiled to a level consistent with surrounding soils; and
 - (d) be re-profiled to original contours and established drainage lines; and
 - (e) be visually consistent with the surround land features; and.
 - (f) be vegetated with groundcover as a minimum to ensure that erosion is minimised.
- (18) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) (other than constructing pipelines) which is not required for the ongoing conduct of the petroleum activity(ies) must commence as soon as practicable, but not longer than nine months following the completion of any construction or operational works associated with the petroleum activity(ies).
- (19) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) must be undertaken in accordance with the Schedule of Disturbance as submitted to the administering authority as part of the financial assurance calculations.
- (110) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) must:
- (a) remediate all contaminated land (e.g. contaminated soils, decommissioned dams containing salt);
 - (b) reshape all significantly disturbed land to a stable landform;
 - (c) re-profile all significantly disturbed land to original contours;
 - (d) on all significantly disturbed land:
 - i. re-establish surface drainage lines;
 - ii. reinstate the top layer of the soil profile;
 - iii. establish groundcover to ensure that erosion is minimised;
 - iv. establish vegetation of floristic species composition found in analogue sites;
 - (e) undertake rehabilitation in a manner such that any actual and potential acid sulfate soils in or on the site are either not disturbed, or submerged, or are treated to prevent and / or minimise environmental harm.
- (111) Notwithstanding condition (I1), all buried pipelines must be decommissioned in accordance with the requirements of Australian Standard 2885, as amended from time to time.
- (112) Despite condition (I1), any dam may be decommissioned for a beneficial use provided that it:
- (a) no longer contains contaminants that will migrate in to the environment; and

- (b) contains water of a quality that is demonstrated to be suitable for all its intended beneficial uses; and
- (c) the administering authority and the landholder agree in writing that the dam will be used by the landholder following the cessation of the petroleum activity(ies).

Rehabilitation Monitoring Program

- (I13) A Rehabilitation Monitoring Program which has been certified by a suitably qualified person must be developed three (3) months after the date of grant of this authority.
- (I14) The Rehabilitation Monitoring Program must include, but not necessarily be limited to:
 - (a) methods to measure subsidence and erosion rates at rehabilitated buried transmission pipeline corridors and buried flow lines;
 - (b) monitoring of indicators identified in the Rehabilitation Plan at analogue sites to measure progressive and final rehabilitation success relevant to the final land use(s); and
 - (c) frequency and seasonality of monitoring analogue sites and rehabilitated areas to assess rehabilitation success; and
 - (d) identification of the experimental design for analysing analogue and rehabilitated site data including statistical methods of analyses.
- (I15) The Rehabilitation Monitoring Program must be implemented.

Monitoring of Progressive Rehabilitation

- (I16) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with conditions (I7) and (I10).

Monitoring of Final Rehabilitation Success

- (I17) Final acceptance criteria are deemed to be met when monitoring of rehabilitated areas demonstrate compliance with the requirements of condition (I1) for three consecutive years.

SCHEDULE J – WELL CONSTRUCTION, MAINTENANCE AND HYDRAULIC FRACTURING ACTIVITIES**Drilling Activities**

- (J1) Oil based drilling muds must not be used in the carrying out of the petroleum activity(ies).
- (J2) Synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).
- (J3) Drilling activities must not result in the connection of the target gas producing formation and another aquifer.
- (J4) Practices and procedures must be in place to detect, as soon as practicable, any fractures that have or may result in the connection of a target formation and another aquifer as a result of drilling activities.
- (J5) Rectification measures must be taken as soon as practicable if the holder of this environmental authority becomes aware that drilling activities have resulted in a change in groundwater quality, groundwater levels or have caused the connection of the target formation and another aquifer.
- (J6) Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in hydraulic fracturing fluids in concentrations above the reporting limit.
- (J7) Accurate and current material safety data sheets for all fluids used in drilling and hydraulic fracturing activities must be published on the environmental authority holder's website.
- (J8) Hydraulic fracturing activities must not negatively affect water quality, other than that within the stimulation impact zone of the target gas producing formation.
- (J9) Hydraulic fracturing activities must not cause the connection of the target gas producing formation and another aquifer.
- (J10) The holder of this authority must ensure the internal and external mechanical integrity of the well system prior to and during hydraulic fracturing such that there is:
 - (a) no significant leakage in the casing, tubing, or packer; and
 - (b) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.
- (J11) Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target gas producing formation and another aquifer.
- (J12) Rectification measures must be taken immediately if the holder of this environmental authority either becomes aware that hydraulic fracturing activities have resulted in a change in water quality other than that

within the stimulation impact zone of the target gas producing formation or that hydraulic fracturing activities have caused the connection of the target gas producing formation and another aquifer.

Stimulation Risk Assessment

- (J13) Prior to undertaking hydraulic fracturing activities, a risk assessment must be developed to ensure that hydraulic fracturing activities are managed to prevent environmental harm.
- (J14) The stimulation risk assessment must address issues at a relevant geospatial scale such that changes to features and attributes are adequately described and must include, but not necessarily be limited to:
- (a) a process description of the hydraulic fracturing activity to be applied, including equipment and a comparison to best international practice;
 - (b) provide details of where, when and how often hydraulic fracturing is to be undertaken on the tenures covered by this environmental authority;
 - (c) a geological model of the field to be stimulated including geological names, descriptions and depths of the target gas producing formation(s);
 - (d) naturally occurring geological faults;
 - (e) seismic history of the region (e.g. earth tremors, earthquakes);
 - (f) proximity of overlying and underlying aquifers;
 - (g) description of the depths that aquifers with environmental values occur, both above and below the target gas producing formation;
 - (h) identification and proximity of landholders' active groundwater bores in the area where hydraulic fracturing activities are to be carried out;
 - (i) the environmental values of groundwater in the area;
 - (j) an assessment of the appropriate limits of reporting for all indicators relevant to hydraulic fracturing monitoring in order to accurately assess the risks to environmental values of groundwater;
 - (k) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
 - (l) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers;
 - (m) a description of the well mechanical integrity testing program;
 - (n) process control and assessment techniques to be applied for determining extent of hydraulic fracturing activities (e.g. microseismic measurements, modelling etc.);
 - (o) practices and procedures to ensure that the hydraulic fracturing activities are designed to be contained within the target gas producing formation;
 - (p) groundwater transmissivity, flow rate, hydraulic conductivity and direction(s) of flow;
 - (q) a description of the chemicals used in hydraulic fracturing activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after hydraulic fracturing;
 - (r) a mass balance estimating the concentrations and absolute masses of chemicals that will be

reacted, returned to the surface or left in the target gas producing formation subsequent to hydraulic fracturing;

- (s) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after hydraulic fracturing including:
 - i. toxicological and ecotoxicological information of chemicals used;
 - ii. information on the persistence and bioaccumulation potential of the chemicals used;
 - iii. identification of the hydraulic fracturing fluid chemicals of potential concern derived from the risk assessment;
- (t) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in hydraulic fracturing activities;
- (u) identification and an environmental hazard assessment of using radioactive tracer beads in hydraulic fracturing activities;
- (v) an environmental hazard assessment of leaving chemicals used in stimulation fluids in the target gas producing formation for extended periods subsequent to hydraulic fracturing;
- (w) human health exposure pathways to operators and the regional population;
- (x) risk characterisation of environmental impacts based on the environmental hazard assessment;
- (y) potential impacts to landholder bores as a result of hydraulic fracturing activities;
- (z) an assessment of cumulative impacts, spatially and temporally of the hydraulic fracturing activities to be carried out on the tenures covered by this environmental authority; and
- (aa) potential environmental or health impacts which may result from hydraulic fracturing activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

(J15) The stimulation risk assessment must be carried out for every well to be stimulated prior to hydraulic fracturing activities being carried out at that well.

Hydraulic Fracturing Water Quality Baseline Monitoring

- (J16) Prior to undertaking any hydraulic fracturing activity, a baseline bore assessment must be undertaken of the water quality of:
- (a) all landholders' active groundwater bores (subject to access being permitted by the landholder) that are spatially located within a two kilometre horizontal radius from the location of the hydraulic fracturing initiation point within the target gas producing formation; and
 - (b) all landholders' active groundwater bores (subject to access being permitted by the landholder) in any aquifer that is within 200 metres above or below the target gas producing formation and is spatially located with a two kilometre radius from the location of the hydraulic fracturing initiation point; and
 - (c) any other bore that could potentially be adversely impacted by the hydraulic fracturing activity(ies) in accordance with the findings of the risk assessment required by conditions (J13) and (J14).

- (J17) Prior to undertaking hydraulic fracturing activities at a well, there must be sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include as a minimum the results of analyses for the parameters in condition (J18).
- (J18) Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to:
- (a) pH;
 - (b) electrical conductivity [$\mu\text{S/m}$];
 - (c) turbidity [NTU];
 - (d) total dissolved solids [mg/L];
 - (e) temperature [$^{\circ}\text{C}$];
 - (f) dissolved oxygen [mg/L];
 - (g) dissolved gases (methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L];
 - (h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L];
 - (i) sodium adsorption ratio (SAR);
 - (j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L];
 - (k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L];
 - (l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, chromium III, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [$\mu\text{g/L}$];
 - (m) total petroleum hydrocarbons [$\mu\text{g/L}$];
 - (n) BTEX (as benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene) [$\mu\text{g/L}$];
 - (o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [$\mu\text{g/L}$];
 - (p) sodium hypochlorite [mg/L];
 - (q) sodium hydroxide [mg/L];
 - (r) formaldehyde [mg/L];
 - (s) ethanol [mg/L]; and
 - (t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].

Hydraulic Fracturing Impact Monitoring Program

- (J19) A Hydraulic Fracturing Impact Monitoring Program which has been certified by a suitably qualified person must be developed prior to the carrying out of hydraulic fracturing activities.
- (J20) The Hydraulic Fracturing Impact Monitoring Program must be able to detect adverse impacts to water quality from hydraulic fracturing activities and must consider the findings of the risk assessment required by conditions (J13) and (J14) that relate to hydraulic fracturing activities and must include, as a minimum, monitoring of:

- (a) the stimulation fluids to be used in hydraulic fracturing activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used; and
 - (b) flow back waters from hydraulic fracturing activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and
 - (c) flow back waters from hydraulic fracturing activities at sufficient frequency and accuracy to demonstrate that 150% of the volume used in hydraulic fracturing activities has been extracted from the stimulated well; and
 - (d) all bores in accordance with condition (J16).
- (J21) The Hydraulic Fracturing Impact Monitoring Program must provide for monitoring of:
- (a) analytes and physico-chemical parameters relevant to baseline bore and well assessments to enable data referencing and comparison including, but not necessarily being limited to the analytes and physico-chemical parameters in condition (J18); and
 - (b) any other analyte or physico-chemical parameters that will enable detection of adverse water quality impacts and the inter-connection with a non-target aquifer as a result of hydraulic fracturing activities including chemical compounds that are actually or potentially formed by chemical reactions with each other or coal seam materials during hydraulic fracturing activities.
- (J22) The Hydraulic Fracturing Impact Monitoring Program must provide for monitoring of the bores in condition (J20) (d) at the following minimum frequency:
- (a) monthly for the first six months subsequent to hydraulic fracturing activities being undertaken; then;
 - (b) annually for the first five years subsequent to hydraulic fracturing activities being undertaken or until analytes and physico-chemical parameters listed in conditions (J18)(b), (J18)(n) – (J18)(t) are not detected in concentrations above baseline bore monitoring data on two consecutive monitoring occasions.
- (J23) The Hydraulic Fracturing Impact Monitoring Program must be implemented.
- (J24) The results of the Hydraulic Fracturing Impact Monitoring Program must be made available to any potentially affected landholder upon request by that landholder.

SCHEDULE K – COMMUNITY ISSUES

- (K1) All complaints received must be recorded including investigations undertaken, conclusions formed and action taken. This information must be made available to the administering authority on request.
- (K2) The holder of this authority must, in consultation with the administering authority, cooperate with and participate in any community environmental liaison committee established in respect of either the site specifically or the industrial estate where the site is located.

SCHEDULE L – NOTIFICATION PROCEDURES

- (L1) In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) when the seepage trigger action response procedure required under condition (Water 14(g)) is or should be implemented
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - i. 200 L of hydrocarbons; or
 - ii. 200 L of stimulation additives; or
 - iii. 500 L of stimulation fluids; or
 - iv. 1 000 L of brine; or
 - v. 5 000 L of untreated coal seam gas water; or
 - vi. 5 000 L of raw sewage; or
 - vii. 10 000 L of treated sewage effluent.
 - (i) the use of restricted stimulation fluids
 - (j) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.
- (L2) Notwithstanding condition (L1), the holder of this environmental authority must telephone the local Public Health Unit (<https://www.health.qld.gov.au/system-governance/contact-us/contact/public-health-units/default.asp>) and any affected drinking water service provider as soon as reasonably practicable, but within 24 hours after becoming aware of any release of contaminants not in accordance with conditions (B18) and (B19).

Notification – Stimulation Activities

- (L3) As soon as reasonably practicable, but not more than 24 hours, after becoming aware of one of the circumstances described in conditions (J3), (J8) or (J9), written notice of the event, its nature and the circumstances in which it happened must be given to:

- (a) the administering authority; and
 - (b) each owner and occupier of land that is, has been, or is reasonably likely to be, affected by the event.
- (L4) As soon as reasonably practicable after the notification in condition (L3), written notice must be given to the administering authority of:
 - (a) the rectification measures implemented under conditions (J5) or (J12);
 - (b) the results of any monitoring carried out on those rectification measures; and
 - (c) the success of the rectification measures implemented.
- (L5) Within 10 business days following the initial notification of an emergency or incident or receipt of monitoring results indicating any significant changes in groundwater quality caused by the petroleum activity(ies) other than that relating to an interconnectivity incident, then the analysis results indicating these changes, including any proposed actions to mitigate the changes in groundwater quality information must be submitted to the administering authority.
- (L6) If groundwater contamination caused by the petroleum activity(ies) is encountered, the following must be reported to satisfy requirements under condition (L5):
 - (a) the level of environmental harm caused as a result of such contamination to soils and groundwater;
 - (b) the conduct of a geodetic survey of all monitoring bores to determine the relative water surface elevations of each bore and reported in metres relative to the AHD; and
 - (c) the determination of groundwater flow direction, groundwater flow rate and hydraulic conductivity.

SCHEDULE M – ORGANIC PRODUCTION TRIAL

- (M1) The **Organic Production Trial** is permitted for a period of three (3) consecutive years from its commencement date.
- (M2) The Organic Production Trial is limited to the well location, target formation, fluid type, water quality impact zone and hydraulic impact zone identified in *Schedule M: Table 1 Details of Authorised Fluid Injection for the Organic Production Trial*.

Schedule M: Table 1 Details of Authorised Fluid Injection for the Organic Production Trial

Well location (Latitude and Longitude)	Bore ID	Target Formation	Fluid Type	Water Quality Impact Zone ¹	Hydraulic Impact Zone ¹
-25° 52' 1.72" S 149° 08' 26.07" E	Spring Gully 9	Bandanna Coal Formation	Nutrient Enriched Produced Water	1km radius from well site	20km radius from the well site
-25° 52' 29.64" S 149° 02' 40.80" E	Durham Ranch 97	Bandanna Coal Formation	Nutrient Enriched Produced Water	1km radius from well site	20km radius from the well site

¹ For details on defining the water quality impact zone and the hydraulic impact zone, refer to the *Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge*.

- (M3) The maximum injection rate for the Organic Production Trial is 160m³/day for each well.
- (M4) The maximum injection pressure for the Organic Production Trial is 1000 kPa_g measured at the wellhead.
- (M5) The maximum volume of **Nutrient Enriched Produced Water** permitted to be injected is 43.2 mega litres (ML) per day.
- (M6) Prior to commencement of the Organic Production Trial the holder of this environmental authority must develop an Organic Production Trial Management Plan including the development of a 12 and 24 month Progress Report.
- (M7) The Organic Production Trial Management Plan must include but not necessarily be limited to:
- (a) estimated volumes and rates of water to be produced and injected;
 - (b) a description of the physical, chemical and biological components and their concentrations of the water to be produced;
 - (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from other waters until it is, treated and re-injected into the source aquifer;

- (d) details of where the fluid is proposed to be treated including a description of the treatment process;
- (e) a water quality compatibility assessment which demonstrates that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (f) the regional characteristics of the receiving environment;
- (g) identification of the water quality impact zone and the hydraulic impact zone;
- (h) identification of any fluid injection well, all existing bores, springs, lakes, wetlands, environmental assets and watercourses connected to groundwater, faults and other geologic features that occur within the water quality impact zone and the hydraulic impact zone;
- (i) identification of the environmental values and water quality objectives of the potential water quality impact zone of the target formation in accordance with the Environmental Protection (Water) Policy 2009 and the Queensland Water Quality Guidelines 2009;
- (j) an assessment of the potential for migration of injection fluid or native groundwater out of the target formation through wells, bores, springs, connected watercourses, faults or other geologic features likely to impact on other aquifers;
- (k) a risk assessment identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and details on sampling and analysis methods to verify preventative measures of potential hazards, including frequency and locations and quality assurance and control;
- (l) verification methods to assess performance of the injection activities;
- (m) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment;
- (n) the indicators or other criteria against which the performance of fluid injection will be assessed;
- (o) procedures that will be adopted to regularly review the monitoring program;
- (p) reporting procedures to management and the administering authority should unforeseen or non-compliant monitoring results be recorded;
- (q) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results; and
- (r) procedures for dealing with accidents, spills, failure of containment structures, and other incidents that may arise in the course of fluid injection.

(M8) The Organic Production Trial Management Plan must be implemented upon commencement of the Organic Production Trial and reviewed and updated at 12 and 24 month intervals from its commencement date.

(M9) The Organic Production Trial Progress Report must include but not necessarily be limited to:

- (a) Analysis, discussion and interpretation of monitoring relative to:
 - i. the trial limits within this environmental authority; and

- ii. baseline water quality in the receiving environment;
 - (b) Details of environmental incidents related to the trial including;
 - i. Date, time and location of incident; and
 - ii. Potential cause of the incident; and
 - iii. Rectification measures taken post incident.
 - (c) Analysis, discussion and interpretation of the maximum observed vertical and horizontal extent of the nutrient enriched produced water;
 - (d) Recommendations based on the analysis of monitoring data as to whether the existing monitoring locations appear suitable to cover the extent of impacts observed from the trial;
 - (e) Analysis and comparison on the volume of the recovered (production phase) injected Nutrient Enriched Produced Water relative to the volume of fluid injected;
 - (f) Analysis and discussion on the post-recovery water management and subsequent quality of the recovered nutrient enriched produced water, relative to the water quality standards for its end uses.
- (M10) **Nutrients** injected into the Bandana Formation under the Organic Production Trial must be measured prior to injection.
- (M11) Monitoring of impacts from the Organic Production Trial at Durham Ranch 97 must be undertaken at the specified well location and monitoring frequency in *Schedule M: Table 2 Authorised Monitoring Locations for the Organic Production Trial Durham Ranch 97*.

**Schedule M: Table 2 Authorised Monitoring Locations for the Organic Production Trial
Durham Ranch 97**

Tenure	Bore ID	Well location (latitude and Longitude)	Total Drilled Depth	Monitoring Frequency
PL195	Durham Ranch 98	-25.8753 149.0540	679.1	Monthly from commencement of injection and Quarterly after injection has ceased
PL195	Durham Ranch 96	-25.8617 149.0415	658.9	
PL195	Durham Ranch 100	-25.8901 149.0461	740.0	
PL195	Durham Ranch 101	-25.8768 149.0201	750.0	

- (M12) Monitoring of impacts from the Organic Production Trial at Spring Gully 9 must be undertaken at the specified well locations and monitoring frequency in *Schedule M: Table 3 Authorised Monitoring Locations for the Organic Production Trial Spring Gully 9*.

**Schedule M: Table 3 Authorised Monitoring Locations for the Organic Production Trial
Spring Gully 9**

Tenure	Bore ID	Well location (latitude and Longitude)	Total Drilled Depth	Monitoring Frequency
PL204	Spring Gully 99	-25.8614 149.1504	863.0	Monthly from commencement of injection and Quarterly after injection has ceased
PL204	Spring Gully 21	-25.8815 149.1476	750.0	
PL204	Spring Gully 1	-25.8808 149.1348	810.0	
PL204	Durham Ranch 5	-25.8635 149.1193	678.2	

- (M13) Water quality at the monitoring location and frequency for the Organic Production Trial specified in Tables *Schedule M: Table 2 Authorised Monitoring Locations for the Organic Production Trial Durham Ranch 97* and *Schedule M: Table 3 Authorised Monitoring Locations for the Organic Production Trial Spring Gully 9* must be monitored for each quality characteristic in the specified unit of measurement in *Schedule M: Table 4 Monitoring Quality Characteristics*.

Schedule M: Table 4 Monitoring Quality Characteristics.

Quality Characteristic	Unit
Electrical Conductivity	µS/cm
Total Dissolved Solids (Calc.)	mg/L
pH	pH Units
Calcium	mg/L
Chloride	mg/L
Fluoride	mg/L
Iodide	mg/L
Magnesium	mg/L
Nitrate (as N)	mg/L
Nitrite (as N)	mg/L
Sodium	mg/L
Aluminium	mg/L
Antimony	mg/L
Arsenic	mg/L
Barium	mg/L
Cadmium	mg/L
Chromium (III+VI)	mg/L
Cobalt	mg/L
Copper	mg/L

Iron	mg/L
Lead	mg/L
Manganese	mg/L
Molybdenum	mg/L
Nickel	mg/L
Selenium	mg/L
Zinc	mg/L

- (M14) **Nutrients**¹ injected under the Organic Production Trial at the monitoring locations and frequency specified in Tables *Schedule M: Table 3 Authorised Monitoring Locations for the Organic Production Trial Durham Ranch 97* and *Schedule M: Table 4 Authorised Monitoring Locations for the Organic Production Trial Spring Gully 9* must be monitored for each Nutrient injected.

¹Note: See definition for Nutrients.

- (M15) Nutrient enriched produced water injected under the Organic Production Trial must be recovered to the surface prior to end use for on-site dust suppression or treatment at the authorised water treatment facility at Spring Gully.
- (M16) The release of recovered nutrient enriched produced water to land for dust suppression must:
- (a) not adversely impact soil quality; and
 - (b) minimise deep drainage below the root zone of any vegetation; and
 - (c) not adversely affect the quality of shallow aquifers; and
 - (d) not exceed the amount required to effectively suppress dust; and
 - (e) not cause on-site ponding or runoff; and
 - (f) be directly applied to the area being dust suppressed; and
 - (g) not cause harm to vegetation; and
 - (h) not cause algal blooms.
- (M17) Recovered nutrient enriched produced water must not be directly or indirectly released to **waters** prior to treatment at the authorised water treatment facility at Spring Gully.
- (M18) Organic Production Trial Cessation Report
- A post Organic Production Trial Cessation Report that has been developed and certified by an **suitably qualified person** must be submitted to the administering authority no later than 90 business days after the completion of the Organic Production Trial and must include but not be limited to:
- a) A record of the commencement date of the Organic Production Trial.
 - b) Summary of the Organic Production Trial process.
 - c) Summary description of the test methods and quality assurance procedures adopted during the trial.
 - d) Details of any mitigation measures implemented throughout the Organic Production Trial and any residual risk.

- e) Details of the injection rate, nutrient load and volume of injected nutrient enriched produced water.
- f) A comparison, analysis and interpretation of the underground water quality and extracted nutrient enriched produced water quality (recovered water quality) throughout the trial.
- g) Analysis and interpretation of all monitoring results including verification that the Organic Production Trial was carried out without incident or environmental harm.
- h) An assessment of compliance with the conditions of this environmental authority.

SCHEDULE N – DEFINITIONS

Term	Definition
acid sulfate soils	means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (<i>actual acid sulfate soils</i>) and / or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (<i>potential acid sulfate soils</i>). The term acid sulfate soil generally includes both actual and potential acid sulfate soils. Actual and potential acid sulfate soils are often found in the same soil profile, with actual acid sulfate soils generally overlying potential acid sulfate soil horizons.
accepted engineering standards	in relation to dams, means those standards of design, construction, operation and maintenance that are broadly accepted within the profession of engineering as being good practice for the purpose and application being considered. In the case of dams, the most relevant documents would be publications of the Australian National Committee on Large Dams (ANCOLD), guidelines published by Queensland government departments and relevant Australian and New Zealand Standards.
administering authority	means: (a) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the <i>Environmental Protection Act 1994</i> – the local government; or (b) for all other matters – the Chief Executive of the Department of Environment and Heritage Protection; or (c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.
aggregation dam	means a regulated dam that receives and contains coal seam gas water or coal seam gas concentrate. The primary purpose of the dam must not be to evaporate the water even though this will naturally occur.
AHD	means Australian Height Datum and is the datum used for the determination of elevations in Australia. The determination uses a national network of benchmarks and tide gauges and sets mean sea level at zero elevation.
analogue site	means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters such as that ground truthing assessment required under the Land Schedule of this environmental authority.
analytes	means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.
annual exceedance probability or AEP	is the probability that <i>a given rainfall total accumulated over a given duration will be exceeded in any one year</i> .
annual return	means the return required by the annual notice (under section 316 of the <i>Environmental Protection Act 1994</i> for the section 86(2) licence that applies to the development approval.
approved quality criteria for mix-bury-cover	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: <u>Part A</u> In all cases:

	<table><tr><th>Parameter</th><th>Maximum concentration</th></tr><tr><td>pH</td><td>6–10.5 (range)</td></tr><tr><td>Electrical Conductivity</td><td>20dS/m (20,000µS/cm)</td></tr><tr><td>Chloride*</td><td>8000mg/L</td></tr></table> *Chloride analysis is only required if an additive containing chloride was used in the drilling process The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing. <u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal: <table><tr><th>Parameter</th><th>Maximum concentration</th></tr><tr><td>Arsenic</td><td>20mg/kg</td></tr><tr><td>Selenium</td><td>5mg/kg</td></tr><tr><td>Boron</td><td>100mg/kg</td></tr><tr><td>Cadmium</td><td>3mg/kg</td></tr><tr><td>Chromium (total)</td><td>400mg/kg</td></tr><tr><td>Copper</td><td>100mg/kg</td></tr><tr><td>Lead</td><td>600mg/kg</td></tr></table> The limits in Part B and Part C refer to the post soil/by-product mix. <u>Part C</u> If a hydrocarbon sheen is visible, the following hydrocarbon fractions: <table><tr><th>TPH</th><th>Maximum concentration</th></tr><tr><td>C6-C10</td><td>170mg/kg</td></tr><tr><td>C10-C16</td><td>150mg/kg</td></tr><tr><td>C16-C34</td><td>1300mg/kg</td></tr><tr><td>C34-C40</td><td>5600mg/kg</td></tr><tr><td>Total Polycyclic Aromatic Hydrocarbons (PAHs)</td><td>20mg/kg</td></tr><tr><td>Phenols (halogenated)</td><td>1mg/kg</td></tr><tr><td>Phenols (non-halogenated)</td><td>60mg/kg</td></tr><tr><td>Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)</td><td>7mg/kg</td></tr><tr><td>Benzene</td><td>1mg/kg</td></tr></table>	Parameter	Maximum concentration	pH	6–10.5 (range)	Electrical Conductivity	20dS/m (20,000µS/cm)	Chloride*	8000mg/L	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	100mg/kg	Lead	600mg/kg	TPH	Maximum concentration	C6-C10	170mg/kg	C10-C16	150mg/kg	C16-C34	1300mg/kg	C34-C40	5600mg/kg	Total Polycyclic Aromatic Hydrocarbons (PAHs)	20mg/kg	Phenols (halogenated)	1mg/kg	Phenols (non-halogenated)	60mg/kg	Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)	7mg/kg	Benzene	1mg/kg	
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associated water	means coal seam gas water																																													
Australian Standard 2885	means Australian Standard 2885.0:2008 “Pipelines – Gas and Liquid Petroleum General Requirements”, Australian Standard 2885.1:2007 “Pipelines – Gas and Liquid Petroleum Design and Construction” and Australian Standard 2885.3:2001 “Pipelines – Gas and Liquid Petroleum Operation and Maintenance”, or any updated versions that becomes available from time to time.																																													
authorised person	means a person holding office as an authorised person under an appointment under the <i>Environmental Protection Act 1994</i> by the chief executive or chief executive officer of a local government.																																													
authorised place	means the place authorised under this approval for the carrying out of the specified environmentally relevant activities.																																													

authorised resource activities	for this environmental authority means the resource activities authorised to be carried out under condition (A1).
background noise level	means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.
bed and banks	for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater
beneficial use	means • with respect to dams, that the current or proposed owner of the land on which a dam stands, has found a use for that dam that is: - of benefit to that owner in that it adds real value to their business or to the general community - in accordance with relevant provisions of the <i>Waste Reduction and Recycling Act 2011</i> - sustainable by virtue of written undertakings given by that owner to maintain that dam, and - the transfer and use have been approved or authorised under any relevant legislation, or • with respect to coal seam gas water, refer to the Department of Environment and Resource Management's Operational Policy - Management of water produced in association with petroleum activities and Notice of decision to approve a resource for beneficial use – CSG water as amended from time to time.
brine	means saline water with a total dissolved solid concentration greater than 40 000 mg/l.
brine dam	means a regulated dam that is designed to receive, contain or evaporate brine
business day	has the meaning in the <i>Acts Interpretation Act 1954</i> and means a day that is not— • a Saturday or Sunday; or • a public holiday, special holiday or bank holiday in the place in which any relevant act is to be or may be done.
category A Environmentally Sensitive Area	means any area listed in Schedule 12, part 1 of the <i>Environmental Protection Regulation 2008</i> .
category B Environmentally Sensitive Area	means any area listed in Schedule 12 part 1 of the <i>Environmental Protection Regulation 2008</i> .
category C Environmentally Sensitive Area	means any of the following areas: • Nature Refuges as defined under the <i>Nature Conservation Act 1992</i>; • Koala Habitat Areas as defined under the <i>Nature Conservation (Koala) Conservation Plan 2006</i>; • State Forests or Timber Reserves as defined under the <i>Forestry Act 1959</i>; • Declared catchment areas under the <i>Water Act 2000</i>; • Resources reserves under the <i>Nature Conservation Act 1992</i>; • An area identified as "Essential Habitat" under the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the <i>Nature Conservation Act 1992</i>.

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certify or certification or certified	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams in this environmental authority means a Statutory Declaration by a suitably qualified person accompanying the written document stating that: - all relevant material has been considered in the written document; and - that the content of the written document is accurate and true; and - that the written document meets the requirements of the relevant conditions of the environmental authority.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
coal seam gas water	means underground water brought to the surface of the earth, or otherwise interfered with, in connection with exploring for or producing coal seam gas. Coal seam gas water is a waste, as defined under s13 of the <i>Environmental Protection Act 1994</i> .
coal seam gas water concentrate	means the concentrated saline water waste stream from a water treatment process that does not exceed a total dissolved solid concentration of 40 000 mg/L.
coal seam gas water dams	include any type of dam (storage or evaporation) used to contain groundwater that is necessarily or unavoidably brought to the surface in the process of coal seam gas exploration or production.
coal seam gas evaporation dam	is defined as an impoundment, enclosure or structure that is designed to be used to hold coal seam gas water for evaporation.
commercial place	means a work place used as an office or for business or commercial purposes.
consequence	in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.
consequence 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 the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures.
construction	in relation to a dam includes building a new dam and modifying or lifting an existing dam but does not include investigations and testing necessary for the purposes of preparing a design plan.
contaminant	means: (a) a gas, liquid or solid; or (b) an odour; or (c) an organism (whether alive or dead), including a virus; or (d) energy, including noise, heat, radioactivity and electromagnetic radiation; or (e) a combination of contaminants.
contaminated land	means land contaminated by a hazardous contaminant.
dam	means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works. A dam does <i>not</i> mean a fabricated or manufactured tank or container, designed and constructed to an Australian Standard that deals with strength and structural integrity of that tank or container.
dam crest volume	means the volume of material that could be within the walls of a dam at any time when the upper level of that material is at the crest level of that dam. That is, the instantaneous maximum volume within the walls without regard to flows entering

	or leaving (e.g. via a spillway).																				
Day	means for the Organic Production Trial a 24 hour day.																				
design plan	is the documentation required to describe the physical dimensions of the dam, the materials and standards to be used for construction of the dam, and the criteria to be used for operating the dam. The documents must include design and investigation reports, specifications and certifications, together with the planned decommissioning and rehabilitation works and outcomes. A design plan may include 'as constructed' drawings.																				
design storage allowance or DSA	means an available volume, estimated in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, prepared by the Department of Environment and Heritage Protection, as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.																				
discharge area	means: - that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and - identified by an assessment process consistent with the document Salinity Management Handbook Queensland Department of Natural Resources, 1997, as amended from time to time; or - identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.																				
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: - any paper or other material on which there is writing; and - any paper or other material on which there are marks; and - figures, symbols or perforations having a meaning for a person qualified to interpret them; and - any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).																				
drilling by-product	means waste drilling materials including muds, liquids and cuttings from well holes which do not contain hydrocarbon sheen above the following hydrocarbon fractions: <table border="1" data-bbox="389 1453 1315 1962"> <thead> <tr> <th>TPH</th><th>Maximum concentration</th></tr> </thead> <tbody> <tr> <td>C6-C10</td><td>170mg/kg</td></tr> <tr> <td>C10-C16</td><td>150mg/kg</td></tr> <tr> <td>C16-C34</td><td>1300mg/kg</td></tr> <tr> <td>C34-C40</td><td>5600mg/kg</td></tr> <tr> <td>Total Polycyclic Aromatic Hydrocarbons (PAHs)</td><td>20mg/kg</td></tr> <tr> <td>Phenols (halogenated)</td><td>1mg/kg</td></tr> <tr> <td>Phenols (non-halogenated)</td><td>60mg/kg</td></tr> <tr> <td>Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)</td><td>7mg/kg</td></tr> <tr> <td>Benzene</td><td>1mg/kg</td></tr> </tbody> </table>	TPH	Maximum concentration	C6-C10	170mg/kg	C10-C16	150mg/kg	C16-C34	1300mg/kg	C34-C40	5600mg/kg	Total Polycyclic Aromatic Hydrocarbons (PAHs)	20mg/kg	Phenols (halogenated)	1mg/kg	Phenols (non-halogenated)	60mg/kg	Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes (includes ortho, para and meta xylenes) and styrene)	7mg/kg	Benzene	1mg/kg
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drilling by-product assessment	means taking representative composite samples of each surface hole, top hole and main hole sections inclusive of changes in mud systems to determine material suitability for land spraying while drilling. Samples must be analysed for																				

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	a minimum of pH, EC, SAR and weight.
ecosystem functioning	means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of an area of vegetation.
end	means the stopping of the particular activity that has caused a significant disturbance in a particular area. It refers to, among other things, the end of a seismic survey or the end of a drilling operation. It does not refer to the end of all related petroleum activities such as rehabilitation. In other words, it does not refer to the 'completion' of the petroleum activity(ies), the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.
environmental nuisance	is unreasonable interference or likely interference with an environmental value caused by: (a) noise, dust, odour, light; or (b) an unhealthy, offensive or unsightly condition because of contamination; or (c) another way prescribed by regulation.
Environmentally Sensitive Area	(as determined from the Department of Environment and Heritage Protection database) means a location, however large or small, that has environmental values that contribute to maintaining biological diversity and integrity, have intrinsic or attributed scientific, historical or cultural heritage value, or are important in providing amenity, harmony or sense of community.
evaporation dam	means an impoundment, enclosure or structure that is designed to be used to hold CSG water for evaporation.
existing authority	has the meaning in section 94 of the <i>Environmental Offsets Act 2014</i> .
existing dam	means an existing evaporation, aggregation or brine dam and any dam that is identified in <i>Schedule C: Table 1 – Existing Spring Gully Dams and Evaporation Ponds</i> in this environmental authority.
financial assurance	means a security deposit, either cash or a bank guarantee, held by the administering authority to cover the potential costs of rehabilitating areas significantly disturbed by the petroleum activities.
fill	means any kind of material in solid form (whether or not naturally occurring) capable of being deposited at a place but does not include material that forms a part of, or is associated with, a structure constructed in a watercourse, wetland or spring including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.
flare pit	has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.
flare precipitant	means waste fluids which result from the operation of a flare.
floodplain	has the meaning in the <i>Water Act 2000</i> and means an area of reasonably flat land adjacent to a watercourse that— • is covered from time to time by floodwater overflowing from the watercourse; and • does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and • has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island in the watercourse.

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flowable substance	means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.
foliage cover	means the proportion of the ground, which would be shaded if sunshine came from directly overhead and is defined for each stratum. It includes branches and leaves and is similar to the crown type of Walker and Hopkins (1990) but is applied to a stratum or plot rather than an individual crown.
green waste	means waste that is grass cuttings, trees, bushes, shrubs, material lopped from trees, untreated timber or other waste that is similar in nature but does not include declared pest species.
groundwater	means subsurface water, generally saturating the soil or rock in which it occurs.
high bank	means the defining terrace or bank or, if no bank is present, the point on the active floodplain, which confines the average annual peak flows in a watercourse.
impulsive noise	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
incidental activity	for this environmental authority means an activity that is reasonably necessary for carrying out a petroleum activity.
infrastructure	means plant or works including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads and tracks, water storage dams, evaporation or storage ponds and tanks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activity(ies) including temporary structures or structures of an industrial or technical nature, including, for example, mobile and temporary camps. Infrastructure does not include other facilities required for the long term management of the impact of those petroleum activities or the protection of potential resources. Such other facilities include dams other than water storage dams, pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.
L _{Aeq} , adj, 15 mins	means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within any 15 minute period has the same square sound pressure as a sound level that varies with time.
L _{A 90} , adj, 15 mins	means the A-weighted sound pressure level, adjusted for tonal character, that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response
L _{A max} , adj, T	is the adjusted average maximum A-weighted sound pressure level measured over a time period T. The maxima must be measured on a sound level meter with a frequency-weighting that corresponds to perceived loudness ("A" weighting) and the meter must be set to the "fast" response time-weighting. The measured values are to be adjusted upwards by 2 dB(A) to 5 dB(A) if the noise source has tonal characteristics. The measuring period must be in excess of five minutes. The arithmetic average of the adjusted maxima, after eliminating any extraneous noise peaks, is the measure used to characterise the noise environment. (This measure will generally be similar to a percent exceedance of 10% or less. Refer to Australian Standard AS1055.)
lake	means: a lagoon, swamp or other natural collection of water, whether permanent or

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	intermittent; and the bed and banks and any other element confining or containing the water.
land spraying while drilling method	means the management of drilling by-products that do not contain active biocides by spraying onto vegetated land at a rate up to 40m ³ /ha per spray area every six months.
landholders' active groundwater bores	for the purposes of stimulation baseline and impact monitoring in this environmental authority means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the <i>Water Act 2000</i> .
levee	means a dyke or bund that is designed only to provide for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from unplanned releases from other works of infrastructure, during the progress of those stormwater or flood flows or those unplanned releases; and does not store any significant volume of water or flowable substances at any other times.
long term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five days, even when there are respite periods when the noise is inaudible within those five days.
low consequence dam	means any dam that is not a high or significant consequence category as assessed using the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> .
low impact activities ³	means activities which do not result in the clearing of native vegetation, cause disruption to soil profiles through earthworks or excavation, or result in significant disturbance to land which cannot be rehabilitated immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test pits), topographic surveys, cadastral surveys and ecological surveys, the installation of monitoring equipment provided that it is within the meaning of low impact and traversing land by car or foot via existing access tracks or routes or in such a way that does not result in permanent damage to vegetation.
Max L _{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
Max L _{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
mandatory reporting level or MRL	means a warning and reporting level determined in accordance with the criteria in the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Structures</i> published by the Department of Environment and Heritage Protection, as amended from time to time.
medium term noise even	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five days and does not re-occur for a period of at least four weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
meter	means a device for measuring, or giving an output signal proportional to, quantities of water passed and/or the rate of flow in a pipe.
mix-bury-cover	means the stabilisation of residual drilling solids in the bottom of a sump by mixing

³ Note this is the same definition used for 'low impact petroleum activities' as defined in the guideline: 'Streamlined model conditions for petroleum activities (EM1274)' but the definition has been changed here so it can also apply to mining activities.

method	with subsoil and which occurs in accordance with the following methodology: - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10–8m/s) or subsoil with a clay content of greater than 20%; and - the residual solids is mixed with subsoil in the sump and cover; and - the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and - a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and - topsoil is replaced.																																																		
month	has the meaning in the <i>Acts Interpretation Act 1954</i> and means a calendar month and is a period starting at the beginning of any day of one of the 12 named months and ending— - immediately before the beginning of the corresponding day of the next named month; or - if there is no such corresponding day—at the end of the next named month.																																																		
NATA accreditation	means accreditation by the National Association of Testing Authorities Australia.																																																		
noise	means a sound or vibration of any frequency, whether transmitted through air or any other physical medium.																																																		
Nutrients, Nutrient	means nutrients with the below maximum concentrations permitted for injection as part of the Organic Production Trial: <table><tr><th>Nutrient</th><th>Composition</th><th>Maximum Concentration (mg/L)</th></tr><tr><td>Urea</td><td>CH4N2O</td><td>25</td></tr><tr><td>Phosphate</td><td>K2HPO4</td><td>4000</td></tr><tr><td rowspan="4">Trace element</td><td>Calcium</td><td>0.05</td></tr><tr><td>Magnesium</td><td>0.05</td></tr><tr><td>Sodium</td><td>0.2</td></tr><tr><td>Potassium</td><td>2.9</td></tr><tr><td rowspan="4">Vitamin</td><td>B1 (Thiamine)</td><td>0.0055</td></tr><tr><td>B2 (Riboflavin)</td><td>0.005</td></tr><tr><td>B6 (Pyridoxine)</td><td>0.0035</td></tr><tr><td>Niacin</td><td>0.05</td></tr><tr><td rowspan="11">Peptone</td><td>Alanine</td><td>2.7</td></tr><tr><td>Arginine</td><td>1.5</td></tr><tr><td>Aspartic acid</td><td>3.3</td></tr><tr><td>Cystine</td><td>0.3</td></tr><tr><td>Glutamic acid</td><td>9.6</td></tr><tr><td>Glycine</td><td>1.6</td></tr><tr><td>Histidine</td><td>0.6</td></tr><tr><td>Isoleucine</td><td>1.6</td></tr><tr><td>Leucine</td><td>2.3</td></tr><tr><td>Lysine</td><td>2.6</td></tr><tr><td>Methionine</td><td>0.5</td></tr></table>	Nutrient	Composition	Maximum Concentration (mg/L)	Urea	CH4N2O	25	Phosphate	K2HPO4	4000	Trace element	Calcium	0.05	Magnesium	0.05	Sodium	0.2	Potassium	2.9	Vitamin	B1 (Thiamine)	0.0055	B2 (Riboflavin)	0.005	B6 (Pyridoxine)	0.0035	Niacin	0.05	Peptone	Alanine	2.7	Arginine	1.5	Aspartic acid	3.3	Cystine	0.3	Glutamic acid	9.6	Glycine	1.6	Histidine	0.6	Isoleucine	1.6	Leucine	2.3	Lysine	2.6	Methionine	0.5
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		Phenylalanine	1.3												
		Proline	1.3												
		Serine	1.4												
		Threonine	1.5												
		Tryptophan	0.7												
		Tyrosine	0.6												
		Valine	1.9												
Nutrient Enriched Produced Water	means produced water enriched with nutrients used as apt of the Organic Production Trial.														
Organic Production Trial	means artificially stimulating the production of methane through biological means.														
permanent	means infrastructure or facilities that are lasting or intended to last for the life of the project and is not temporary or mobile.														
petroleum activity	for this environmental authority means an authorised resource activity listed under the heading “Petroleum activities” in <i>Schedule A: Table 1 – Authorised Petroleum Activities</i> .														
petroleum authority	is– • a 1923 Act petroleum tenure granted under the <i>Petroleum Act 1923</i>; or • an authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey licence or pipeline licence granted under the <i>Petroleum and Gas (Production and Safety) Act 2004</i>; or • a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the <i>Petroleum (Submerged Lands) Act 1982</i>.														
Prescribed environmental matters	has the meaning in section 10 of the <i>Environmental Offsets Act 2014</i> , limited to the matters of State environmental significant listed in schedule 2 of the Environmental Offsets Regulation 2014.														
project area	for this environmental authority means the area located within the boundaries of the following tenures: Petroleum Lease (PL) 195, PL200, PL204, PL268, PL414, PL415, PL416, PL417, PL418 and PL419.														
receiving soil assessment	means an assessment undertaken of background soil conditions prior to land spraying while drilling activities. The receiving soil assessment must include taking a minimum of three representative samples. Collected samples must be analysed for a minimum of pH, EC, SAR and CEC, total N, total metals (aluminium, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, tin, strontium, uranium, vanadium and zinc), TPH and BTEX.														
receiving soil criteria	means the receiving soil criteria meets the following quality standards: <table><tr><th>Parameter</th><th>Analysis Method</th><th>Maximum concentration</th></tr><tr><td>Electrical Conductivity</td><td>1:5</td><td>3 dS/m (3000 uS/cm)</td></tr><tr><td>Sodium Adsorption Ratio (SAR)</td><td>Saturated paste</td><td>5</td></tr><tr><td>pH</td><td>1:5</td><td>6-10.5 (range)</td></tr></table>			Parameter	Analysis Method	Maximum concentration	Electrical Conductivity	1:5	3 dS/m (3000 uS/cm)	Sodium Adsorption Ratio (SAR)	Saturated paste	5	pH	1:5	6-10.5 (range)
Parameter	Analysis Method	Maximum concentration													
Electrical Conductivity	1:5	3 dS/m (3000 uS/cm)													
Sodium Adsorption Ratio (SAR)	Saturated paste	5													
pH	1:5	6-10.5 (range)													
regulated dam	means any dam or levee in the significant or high consequence category as														

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	assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, published by the Department of Environment and Heritage Protection, as amended from time to time.
regulated structure	means any dam or levee in the significant or high consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Dams, published by the Department of Environment and Heritage Protection, as amended from time to time.
regulated waste	means non-domestic waste mentioned in Schedule 7 of the Environmental Protection Regulation 2008 (whether or not it has been treated or immobilised), and includes: for any element – any chemical compound containing the element; and anything that has contained the waste.
rehabilitation	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with the acceptance criteria set out in this environmental authority and, where relevant, includes remediation of contaminated land.
reporting limit	means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as “less than” the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L–0.02 ug/L.
residual drilling material	means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
Treated CSG water	means the treated coal seam gas water produced from the Spring Gully Water Treatment Facility.
secondary treated class C standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • total nitrogen as N, maximum 30mg/L • 5-day biochemical oxygen demand (inhibited) (e.g. Release pipe from sewage treatment plant), maximum 20mg/L • suspended solids, maximum 30mg/L • pH, range 6.0 to 8.5 • e-Coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 10 000cfu per 100mL, maximum 100 000cfu per 100mL
sensitive place	means: • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees

	accommodation or public roads.
sensitive receptor	means an area or place where noise (including low frequency, vibration and blasting) is measured to investigate whether nuisance impacts are occurring and includes: • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel; or • a library, childcare centre, kindergarten, school, university or other educational institution; • a medical centre, surgery or hospital; or • a protected area; or • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment; or • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.
significantly disturbed land or significant disturbance to land or significant disturbance	means disturbance to land as defined in section 28 of the <i>Environmental Protection Regulation 2008</i> .
soil end point assessment	means an assessment of soil conditions following land spraying while drilling. The soil end point assessment must include taking a minimum of three samples within a 60 day period from commencing land spraying while drilling. Collected samples must be analysed for a minimum of pH, EC, SAR and CEC, total N, total metals (aluminium, arsenic, barium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, tin, strontium, uranium, vanadium and zinc), TPH and BTEX.
species richness	means the number of different species in a given area.
species diversity	means the diversity within an ecological community that incorporates both species richness and the evenness of species' abundances.
specified relevant activity	for this environmental authority means an activity that: • but for being carried out as a resource activity, would otherwise be a prescribed ERA; • stimulation activities; • point source discharge of treated produced water to surface waters; • storing waste that is not regulated waste (including coal seam gas water) in a regulated dam; or • storing coal seam gas water that is not regulated waste in a low consequence dam, or; • borrow pits or quarries that extract more than 5000 tonnes of material in the project area.
spillway	means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges from the dam, normally under flood conditions or in anticipation of flood conditions.

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stable	in relation to land, means landform dimensions are or will be stable within tolerable limits now and in the foreseeable future. Stability includes consideration of geotechnical stability, settlement and consolidation allowances, bearing capacity (trafficability), erosion resistance and geochemical stability with respect to seepage, leachate and related contaminant generation.
stimulation	means a technique used to increase the permeability of natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. It includes hydraulic fracturing / hydrofracturing, fracture acidizing and the use of proppant treatments. This definition is restricted from that in the <i>Petroleum and Gas (Production and Safety) Act 2004</i> in order to only capture the types of stimulation activities that pose a risk to environmental values of water quality in aquifers.
stimulation fluid	means the fluid injected into an aquifer to increase the permeability of a natural underground reservoir. For clarity, the term stimulation fluid only applies to fluids injected down well post-perforation.
stimulation impact zone	means a 100 metre maximum radial distance from the stimulation target location within a gas producing formation.
structure	means a dam or levee.
suitably 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 to performance relative to the subject matter using the relevant protocols, standards, methods or literature.
suitably qualified and experienced person	in relation to regulated structures means a person who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the <i>Professional Engineers Act 2002</i>, and has demonstrated competency and relevant experience: • for regulated dams, an RPEQ who is a civil engineer with the required qualifications in dam safety and dam design. • for regulated levees, an RPEQ who is a civil engineer with the required qualifications in the design of flood protection embankments. Note: It is permissible that a suitably qualified and experienced person obtain subsidiary certification from an RPEQ who has demonstrated competence and relevant experience in either geomechanics, hydraulic design or engineering hydrology.
suitably qualified third party	means a person who: (a) has qualifications and experience relevant to performing the function including but not limited to: - a bachelor's degree in science or engineering; and 3 years' experience in undertaking soil contamination assessments; and (b) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2008; (c) and not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.
sump	means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.
top soil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300 mm in depth from the natural surface.
treated sewage	is the effluent discharged from a sanitary appliance (i.e. sewage treatment works).

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underground gas storage	means evaluating, developing and using natural underground reservoirs for petroleum storage or to store prescribed storage gases, including, for example, to store petroleum or prescribed storage gases for others.
valid complaint	means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.
void	means any man-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).
waste and resource management hierarchy	has the meaning provided in section 9 of the <i>Waste Reduction and Recycling Act 2011</i> and is the following precepts, listed in the preferred order in which waste and resource management options should be considered— (a) AVOID unnecessary resource consumption (b) REDUCE waste generation and disposal (c) RE-USE waste resources without further manufacturing (d) RECYCLE waste resources to make the same or different products (e) RECOVER waste resources, including the recovery of energy (f) TREAT waste before disposal, including reducing the hazardous nature of waste (g) DISPOSE of waste only if there is no viable alternative.
waste and resource management principles	has the meaning provided in section 4(2)(b) of the <i>Waste Reduction and Recycling Act 2011</i> and means the: (a) polluter pays principle (b) user pays principle (c) proximity principle (d) product stewardship principle.
waste fluids	has the meaning in section 13 of the <i>Environmental Protection Act 1994</i> in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
water quality impact zone	is the area within which a measurable change in water quality parameters or characteristics due to injection is apparent.
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water
watercourse	has the meaning provided in section 5 of the <i>Water Act 2000</i> and includes the bed and banks and any other element of a river, creek or stream confining or containing water.
wetlands	an area shown as a wetland on the map of Queensland Wetland Environmental Values. <i>Note: The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 2, Map of Queensland Wetland Environmental Values means the document ‘Map of Queensland Wetland Environmental Values’ made by the Chief Executive and published on the website.</i> <i>Environmental values in section 8 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 apply to wetland areas on the map, which are categorised as wetlands of high or general ecological significance.</i>

year	means a period of 12 months.
12 months daily average	means average of samples taken over 12 months.

END OF PERMIT

APPENDIX 1 – CRITERIA FOR DETERMINING WHETHER WATER PRODUCED FROM PETROLEUM ACTIVITIES IS A HAZARDOUS WASTE

The holder of a Petroleum Authority may require containment structures to be constructed within the authority for raw water storage, storage and evaporation of contaminated waters, containment of associated water that is saline or contains hydrocarbons, storage of process waters, or the containment of contaminated solids formed from such waters.

The assessment process for the determination if water produced from petroleum activities is a hazardous waste is dependent on whether the water can comply with the hazardous contaminant limits listed in Table 1 below. If the content of the water produced from petroleum activities cannot comply with the limits in Table 1, then the water is a hazardous waste.

Table 1 – Determination whether water produced from petroleum activities is hazardous waste and must not be removed from the evaporation pond for land irrigation or discharge to a water body.

Contaminant ⁴	Concentration
Arsenic	Greater than or equal to 0.5 mg/l
Boron	Greater than or equal to 5.0 mg/l
Cadmium	Greater than or equal to 10µg/l
Cobalt	Greater than or equal to 1.0 mg/l
Copper	Greater than or equal to 1.0 mg/l
Lead	Greater than or equal to 0.1 mg/l
Mercury	Greater than or equal to 2µg/l
Nickel	Greater than or equal to 1.0 mg/l
Zinc	Greater than or equal to 20 mg/l
Chloride	Greater than or equal to 1,500 mg/l
Fluoride	Greater than or equal to 2.0 mg/l
Selenium	Greater than or equal to 0.02 mg/l
Sulphate	Greater than or equal to 1,000 mg/l
Cyanide	Greater than or equal to 10 mg/l
pH	Below 5.5 and greater than 8.3
Nitrite	Greater than or equal to 30 mg/l
Nitrate	Greater than or equal to 400 mg/l
Electrical Conductivity (or equivalent)	Greater than or equal to 1000 µS/cm
Aromatic Hydrocarbons	Greater than or equal to 600 µg/l
Polycyclic Aromatic Hydrocarbons	
Naphthalene	Greater than or equal to 16µg/l
Benzo (a) pyrene	Greater than or equal to 0.2 µg /l
Phenol	Greater than or equal to 320 µg/l
Polychlorinated Biphenyls	
Aroclor 1242	Greater than or equal to 0.3 µg /l
Aro 1254	Greater than or equal to 0.1 µg /l
Total Petroleum Hydrocarbons	Greater than or equal to 10 mg/l (or no visible film)
Blue green Algae (Microcystis)	Greater than or equal to 11,000 cells/ml

END OF ENVIRONMENTAL AUTHORITY

⁴ Metals should be analysed in accordance with recognised test methods by a NATA certified laboratory.