

Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

Environmental authority

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

Permit¹ number: EPPG00885313

Project Name: Spring Gully

Environmental authority takes effect on 20 February 2014.

The anniversary date of this environmental authority is **15 August**.

An annual return and the payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name	Registered address
Australia Pacific LNG Pty Limited	Level 4, 135 Coronation Drive MILTON QLD 4064
Australia Pacific LNG CSG Marketing Pty Limited	Level 45 Australia Square 264-278 George Street SYDNEY NSW 2000

Environmentally relevant activity and location details

Environmentally relevant activity(ies)	Location(s)
Schedule 2A – 3 – a petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area	PL195 PL200 PL203 PL204 PL268 PL414 PL415 PL416 PL417 PL418 PL419
Schedule 2A – 6 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	
Schedule 2A – 7 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer	
Schedule 2A – 8 – a petroleum activity or GHG storage activity, other than an activity mentioned in any of items 1 to 7, that includes 1 or more activities	

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

<p>mentioned in schedule 2 for which an AES is stated, namely:</p> <p>Electricity generation – generating electricity by using gas at a rated capacity of 10MW electrical or more.</p> <p>Fuel burning - consists of using fuel burning equipment that is capable of burning at least 500 kg of fuel in an hour</p> <p>Regulated waste storage – receiving and storing regulated waste other than tyres</p> <p>Waste disposal - operating a facility for disposing of, in a year, more than 200 000t of regulated waste and any, or any combination, of the following –</p> <ul style="list-style-type: none"> (a) general waste; (b) limited regulated waste; (c) if the facility is in a scheduled area – no more than 5t of untreated clinical waste in a year <p>Sewage treatment - operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 to 1,500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme</p> <p>Water treatment – Desalinating, in a day, more than 5ML of water, allowing the release of waste to waters other than seawater</p> <p>Chemical storage – Storing 200m³ or more of chemicals that are liquids, other than chemicals mentioned in items 1 to 3, under subsection (1)(d)</p>	
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Additional information for applicants

Environmentally relevant activities

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

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

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

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Contaminated land

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


Signature


Date

Gillian Naylor
Delegate of the administering authority
Environmental Protection Act 1994
Department of Environment and Heritage Protection

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Responsibilities under the Environmental Protection Act 1994

Separate to the requirements of the conditions of this environmental authority, the holder of the environmental authority must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act. For example, the holder must be aware of the following provisions of the *Environmental Protection Act 1994*:

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to think about these issues:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of the successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty, however maintaining your general environmental duty is a defence against the following acts:

- a) an act that causes serious or material environmental harm or an environmental nuisance
- b) an act that contravenes a noise standard
- c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Heritage Protection website www.ehp.qld.gov.au.

Duty to notify

Section 320 of the *Environmental Protection Act 1994* explains the duty to notify. The duty to notify applies to all persons and requires a person or company to give notice where serious or material environmental harm is caused or threatened. Notice must be given of the event, its nature and the circumstances in which the event happened. Notification can be verbal, written or by public notice depending on who is notifying and being notified.

The duty to notify arises where:

- a person carries out activities or becomes aware of an act of another person arising from or connected to those activities which causes or threatens serious or material environmental harm
- while carrying out activities a person becomes aware of the happening of one or both of the following events:
 - the activity negatively affects (or is reasonably likely to negatively affect) the water quality of an aquifer
 - the activity has caused the unauthorised connection of 2 or more aquifers.

For more information on the duty to notify requirements refer to the guideline *Duty to notify of environmental harm (EM467)*.

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Some relevant offences under the *Environmental Protection Act 1994*

Non-compliance with a condition of an environmental authority (section 430)

Section 430 of the *Environmental Protection Act 1994* requires that a person who is the holder of, or is acting under, an environmental authority must not wilfully contravene, or contravene a condition of the authority.

Environmental authority holder responsible for ensuring conditions complied with (section 431)

Section 431 of the *Environmental Protection Act 1994* requires that the holder of an environmental authority must ensure everyone acting under the authority complies with the conditions of the authority. If another person acting under the authority commits an offence against section 430, the holder also commits an offence, namely, the offence of failing to ensure the other person complies with the conditions.

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is environmental harm that is not trivial or negligible in nature. It may be great in extent or context or it may cause actual or potential loss or damage to property. The difference between material and serious harm relates to the costs of damages or the costs required to either prevent or minimise the harm or to rehabilitate the environment. Serious environmental harm may have irreversible or widespread effects or it may be caused in an area of high conservation significance. Serious or material environmental harm excludes environmental nuisance.

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed contaminants include a wide variety of contaminants listed in Schedule 9 of the *Environmental Protection Act 1994*.

It is your responsibility to ensure that prescribed contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the *Waste Reduction and Recycling Act 2011*

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

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Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200L or more) at a place. Illegal dumping can also include abandoned vehicles.

Responsibilities under other legislation

An environmental authority pursuant to the *Environmental Protection Act 1994* does not remove the need to obtain any additional approval for the activity that might be required by other State and/or Commonwealth legislation. Other legislation for which a permit may be required includes but is not limited to the:

- *Aboriginal Cultural Heritage Act 2003*
- contaminated land provisions of the *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Nature Conservation Act 1992*
- *Petroleum and Gas (Production and Safety) Act 2004 / Petroleum Act 1923*
- *Queensland Heritage Act 1992*
- *Strategic Cropping Land Act 2011*
- *Sustainable Planning Act 2009*
- *Water Supply (Safety and Reliability) Act 2008*
- *Water Act 2000*

Applicants are advised to check with all relevant statutory authorities and comply with all relevant legislation.

An environmental authority for petroleum activities is not an authority to negatively impact on water levels or pressure heads in groundwater aquifers in or surrounding formations. There are obligations to minimise or mitigate any such negative impact under other Queensland Government and Commonwealth Government legislation.

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Conditions of environmental authority

This environmental authority consists of the following Schedules:

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This environmental authority contains standard conditions from *Eligibility criteria and standard conditions – Petroleum exploration activities* (2013), version 1, published by the Queensland Government. The standard conditions are identified by the code PESC, which appears following the condition wording throughout this environmental authority.

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SCHEDULE A - GENERAL CONDITIONS

Authorised Petroleum Activities

(A1) In the carrying out of the petroleum activity(ies), the holder of this environmental authority must not exceed the number and maximum size for each of the specified petroleum activities listed in Schedule A, Table 1 – Authorised Petroleum Activities for each petroleum tenure.

Schedule A, Table 1 – Authorised Petroleum Activities

Resource Authority Number	Petroleum Activity	Number of Existing Petroleum activities or hectares where not quantified	Number of Proposed Petroleum activities 2012-2016	Maximum disturbance area 2012-2016 petroleum activities (excludes disturbance prior to 2012)
PL195 PL200 PL203 PL268 PL204 PL414 PL415 PL416 PL417 PL418 PL419	Seismic	0	1,000km (3D) 500km ² /2D 500km)	250ha
	Total coal seam gas wells ¹	189	180	230ha
	Exploration/Appraisal Wells ²	10	25	75ha
	Development Wells	179	155	155ha
	Gathering network (water/gas)	250km	365km	657ha
	Water Transfer Stations	2	7	56ha
	Central Compressor Stations	3	1	23ha
	Regulated dams >401 megalitres			
	• Brine	2	1	170ha
	• Aggregation	0	0	0ha
	Regulated dams <400 megalitres			
	• Brine	0	0	0ha
	• Aggregation	2	0	0ha
	Exploration/Appraisal Evaporation Dams	10	13	0ha ³
	Low hazard dams	1	2	2ha
	Water treatment facility	1 (12 ML/day)	0	0ha
	Brine Encapsulation Facilities	0	0	0ha
	Sewage Treatment Plants plus associated effluent irrigation areas			
	21-100 EP	3 ⁴	2	20ha ⁵
	100-1500 EP	0	5 ⁶	
	Water Transfer Pipeline	50km	75km	375ha

¹ Total of 600 wells approved (Origin Approval, Year 2004)

² Assumes 3 x 5 multi-well pilots

³ Areas of disturbance included in disturbance limits from exploration and appraisal wells

⁴ The existing Talooa Camp and Office Sewage Treatment Plant will be upgraded to 100-1500 EP therefore the number of sewage treatment plants 21-100 EP will total 2 by 2016.

⁵ Area is estimated, the final effluent disposal area will be determined based on MEDLI Modelling or proposed Sewage Treatment Plants.

⁶ The STPs refer to Spring Gully, Talooa, Eurombah Creek, Pond C and Pongamia Camps.

Resource Authority Number	Petroleum Activity	Number of Existing Petroleum activities or hectares where not quantified	Number of Proposed Petroleum activities 2012-2016	Maximum disturbance area 2012-2016 petroleum activities (excludes disturbance prior to 2012)
	Accommodation (Permanent and Temporary)	2 ⁷	3 ⁸	18ha
PL204	Power station	0	1 ⁹ (<50MW)	4 ha

Maintenance of Measures, Plant and Equipment

- (A2) 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; and
 - (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.

Financial Assurance

- (A3) Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*. (PESCB1)

Documentation and Records Management

- (A4) A record of all documents required by this environmental authority must be kept for a minimum of five (5) years.
- (A5) 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

- (A6) The only gas to be reinjected and stored underground is coal seam gas.
- (A7) 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.

⁷ The existing accommodation includes Spring Gully permanent and temporary as 1 accommodation facility being co-located and the Talooka facilities temporary accommodation.

⁸ These camps refer to Eurombah Creek, Pond C and Pongamia.

⁹ Eurombah Creek power station located on Lot 9 Plan AB244

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

- (A8) Gas reinjection must not result in:
- (a) fracturing the target formation; or
 - (b) surface migration of the injected gas; or
 - (c) loss of containment from within the impact zones; or
 - (d) ingress to building and structures; or
 - (e) fugitive emissions.
- (A9) 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.
- (A10) The maximum quantity of gas authorised to be reinjected and stored underground under this environmental authority is 1.13 Bscf.
- (A11) The maximum surface injection pressure must not exceed 900 psia.
- (A12) Tracers must not be injected underground.
- (A13) The gas reinjection pilot trial must not exceed 24 weeks.
- (A14) 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

- (A15) 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 (3) months of the cessation of the gas reinjection trial.
- (A16) The gas reinjection trial report must include the results of the Gas Injection Trial Impact Monitoring Program required by conditions (A17) and (A18) 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;

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- (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 (A16)(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

- (A17) 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.
- (A18) 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;

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- 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;
 - e. 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 Plan for Emergency Environmental Incidents

- (A19) A Contingency Plan for Emergency Environmental Incidents must be developed prior to 28 November 2012.
- (A20) The Contingency Plan for Emergency Environmental Incidents must include, but not necessarily be limited to:
 - (a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity(ies) authorised to be carried out under this environmental authority;
 - (b) identification of the types of environmental incidents that may occur, including but not limited to flooding impacts, relevant to the petroleum activity(ies) authorised to be carried out under this environmental authority;
 - (c) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (d) the resources to be used in response to environmental emergency incidents;
 - (e) procedures for responding to chapter 5a aquifer incidences including identification of available rectification measures;
 - (f) incidents resulting from chapter 5a aquifer events including those that could result from hydraulic fracturing activities, including identification of available and potentially suitable rectification measures
 - (g) plans for restoring loss of well mechanical integrity so as to prevent environmental harm;
 - (h) procedures to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of a dam;
 - (i) procedures to respond to a regulated dam reaching its mandatory reporting level;
 - (j) procedures to respond to a regulated dam reaching its design storage allowance;
 - procedures to investigate the cause of any incidents including releases or near misses, and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (k) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;

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- (l) procedures for accessing monitoring locations during emergency environmental incidents;
- (m) a receiving environment monitoring program, to be specifically implemented in the event of a release to waters or land to examine / assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring procedures. For soils monitoring, three replicate samples must be taken at depth intervals of 0-10 cm, 20-30 cm and 50-60 cm at both a reference site and the impact site as a minimum;
- (n) communication procedures and lines of communication within and beyond the organisation, including but not limited to Local Government, to be employed in responding to environmental emergency incidents;
- (o) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
- (p) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
- (q) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the Administering Authority and any affected landholder, occupier and / or their nominated representative in accordance with conditions of this environmental authority.

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SCHEDULE B – WATER

Release to Waters of Treated or Good Quality Coal Seam Gas Water

- (B1) Contaminants must not be directly or indirectly released to any waters except as permitted under this environmental authority as specified in Schedule B.
- (B2) The discharge of permeate from the reverse osmosis (RO) plant located on PL195 is prohibited until approval has been given by the Queensland Office of the Water Supply Regulator (OWSR).
- (B3) The release of Reverse Osmosis (RO) permeate must cease on or before 31 March 2014.
- (B4)(a) The maximum volume of RO permeate that may be released under this environmental authority must not exceed 8.5ML per day.
- (B4)(b) Notwithstanding condition (B4)(a), for the period of release authorised under the approval given by OWSR pursuant to condition (B2), the maximum volume of RO permeate that is authorised under this environmental authority must not exceed 10.2 ML per day.
- (B5) The release of RO permeate must only occur from the release point specified in Schedule B - Table 1 and depicted in Appendix 2 – Map - *Spring Gully Discharge Monitoring Points* attached to this environmental authority.

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

Release Point	Latitude or Northing (GDA94)	Longitude or Easting (GDA94)	Contaminant Source and Location	Monitoring Point	Receiving Waters Description
R1 - Outlet of discharge pipe to Eastern Gully	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

- (B6) The release of RO permeate to waters must not exceed the release limits and limit types stated in Schedule B, Table 2- Contaminant Release Limits for Release Point when measured at the monitoring points specified in Schedule B, Table 1- Contaminant Release Points, Sources and Receiving Waters for each quality characteristic.

Schedule B, Table 2 – Contaminant Release Limits for Release Point

Quality Characteristic	Release Limits	Limit Type	Monitoring Frequency
pH (pH Unit)	6.5 – 9.0	Minimum and maximum range	Daily during discharge
Boron (mg/L)	0.8	Maximum	Weekly during discharge
Electrical Conductivity (µS/cm)	370	12 months daily average	Daily during discharge
	425	Maximum	Daily during discharge
*Temperature (°C)	Nil	Nil	Daily during discharge
Temperature Difference (°C)	± 2	Maximum temperature difference between a near field downstream monitoring point and an upstream monitoring point;	Daily during discharge
Calcium (mg/L)	5.0	Minimum	Daily during discharge

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Quality Characteristic	Release Limits	Limit Type	Monitoring Frequency
Turbidity (NTU)	50	Maximum	Weekly during discharge
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	

* applies only when natural flow down Eurombah Creek is occurring – background temperature should be recorded upstream of the confluence of Eastern Gully and Eurombah Creek, i.e. either at monitoring point SGSW7, SGSW15 or SGSW19 (refer to Appendix 2 Map – Spring Gully Discharge Monitoring Points).

- (B7) The release of RO permeate to waters from the authorised release point must be monitored at the monitoring point specified in Schedule B, Table 1 - Contaminant Release Points, Sources and Receiving Waters for each quality characteristic and at the frequency specified in Schedule B, Table 2 - Contaminant Release Limits for Release Point.
- (B8) Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build up of sediment in such waters.
- (B9) Releases to waters must be undertaken so as not to cause flooding of Eurombah Creek during average rainfall events.
- (B10) If the quality of the RO permeate as required under condition (B6) does not meet the criteria specified in Schedule B, Table 2 - Contaminant Release Limits for Release Point, the holder of this authority must:
- notify the Administering Authority within five (5) business days; and
 - 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:
 - details of the investigations carried out; and
 - taken to prevent and/or minimise environmental harm.
- (B11) Each authorised monitoring and release point must be conspicuously marked and be readily identifiable from the banks of Eastern Gully and/or Eurombah Creek.
- (B12) Reasonable access to the water quality monitoring points must be provided.
- (B13) The environmental authority holder must install and maintain a measuring device to measure/ meter the volume of treated CSG water released under this environmental authority.
- (B14) The measuring device/ meter must be installed prior to commencement of release of treated coal seam gas water and its installation must comply with the 'Draft standards and specifications for measuring /metering disposal of treated CSG water' (available from the Administering Authority upon request).
- (B15) Upon practical completion of the meter installation, the holder of this environmental authority must provide a completed "Meter Installation Form", as amended from time to time, signed by the installer and the holder of this environmental authority confirming that the installation complies with the manufacturer's specifications and/or national standards and/or the Department of Environment and Heritage Protection's "Standards and specifications for measuring / metering disposal of treated coal seam gas water" as amended from time to time, whichever is applicable.

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- (B16) The environmental authority holder must provide the Administering Authority with safe access to facilitate inspections, and must comply with any instructions issued by the Administering Authority relevant to the operation of the pump and meter installation.
- (B17) The environmental authority holder must measure and record daily:
- (a) the volume released to waters from each release point at the monitoring point in Schedule B – Table 1 – Contaminant Release Points, Sources and Receiving Waters;
 - (b) the release rate, and
 - (c) for any change in the release rate—
 - i. the date and time of the change; and
 - ii. the new release rate.
- (B18) The holder of this environmental authority must notify the Administering Authority within five (5) business days of any meter malfunction or maintenance of the meter).
- (B19) The holder of this environmental authority must arrange for the repair or replacement of a malfunctioning meter within five (5) business days of becoming aware of the malfunction and provide a repair and/or maintenance completion report within 10 business days of the repair or maintenance.

Receiving Environment Monitoring Program (REMP)

- (B20) A REMP must be implemented to monitor and record the effects of the release of contaminants on the receiving environment whilst contaminants are being discharged. The aim is to identify and describe the extent of any potentially adverse environmental impacts to local environmental values. Monitoring any changes in the receiving water is a requirement under the REMP. For the purposes of the REMP the receiving environment is defined as the waters of Eurombah Creek and includes monitoring points SGSW7 and SGSW34 (refer to Appendix 2 Map – Spring Gully Discharge Monitoring Points).
- (B21) The REMP must be maintained by a person(s) possessing appropriate qualifications and experience in the field of hydrology and surface water monitoring program design.
- (B22) The REMP must address, but not be limited to:
- (a) a description of potentially affected 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) Policy 2009*);
 - (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;

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- (h) monitoring and assessment of the banks and beds of the receiving environment for SAR and an assessment of bank soil / bed sediment erosion;
 - (i) monitoring of contaminants should consider the limits specified in Schedule B, Table 2 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;
 - (j) 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);
 - (k) 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;
 - (l) 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.
 - (m) the methods for analysis and interpretation of all monitoring results;
 - (n) the locations of monitoring points (including the locations of proposed background and downstream impacted sites for each release point);
 - (o) the frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) 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;
 - (p) specify sampling and analysis methods and quality assurance and control;
 - (q) any historical data sets to be relied upon;
 - (r) description of the statistical basis on which conclusions are drawn;
 - (s) any analogue or reference sites; and
 - (t) recording of planned and unplanned releases to watercourses, procedures for event monitoring, monitoring methodology used and procedure to establish background surface water quality.
- (B23) The REMP must be prepared and submitted in writing to the Administering Authority three (3) months after this environmental authority has taken effect.

Discharge to Waters Release Strategy

- (B24) 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 within 6 months upon the granting of this authority should the holder of this authority intend to continue the discharge of treated coal seam gas water to Eurombah Creek.
- (B25) The strategy required by condition (B24) 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.

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Water Release Reduction Strategy

- (B26) 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 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 (3) 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.
- (B27) 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

- (B28) The release of RO permeate 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.
- (B29) 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.
- (B30) 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.
- (B31) 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.

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- (B32) 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.

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.

Groundwater

- (B34) The holder of this authority must maintain and implement a groundwater monitoring program that detects any significant changes to groundwater quality and level due to activities authorised under of this environmental authority. The program must:
- (a) include a groundwater monitoring network designed and installed for evaporation ponds or dams;
 - (b) include a sufficient number of monitoring sites to provide information on the following:
 - i. detection of seepage from evaporation ponds or dams;
 - ii. background groundwater quality in hydraulically up-gradient or background bore(s) that have not been affected by any release of contaminants to groundwaters;
 - (c) include location of monitoring points, parameters to be measured, frequency of monitoring, monitoring methodology used, trigger values, and procedures to establish background groundwater quality; and
 - (d) be installed and maintained by a person possessing appropriate qualifications and experience in the fields of hydrogeology and groundwater monitoring program design to be able to competently make recommendations about these matters.
- (B35) The release of contaminants to groundwater is not considered to cause environmental harm, if monitoring carried out as described in condition (B34) shows that the release does not result in statistically significant, mid to long term water level and contaminant concentration increases of more than 10% above what would seasonally be expected at existing bores used to provide water for potable, livestock watering or irrigation purposes.
- (B36) The holder of this authority must report the results and analysis of groundwater monitoring to the Administering Authority:
- (a) when any significant changes in water level and/or deterioration in groundwater quality is detected; and
 - (b) upon request by the Administering Authority.
- (B37) If groundwater monitoring indicates that changes as described in conditions (B35) and (B36) occur, then the information required must include any proposed actions to mitigate the changes in groundwater quality or quantity as well as means to prevent the event recurring.
- (B38) 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.

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- (B39) 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.
- (B40) The holder of this environmental authority is authorised to undertake a trial injection program in accordance with conditions (B41) to (B56).

Injection of CSG Water

- (B41) 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 3 – Details of Authorised Fluid Injection.

Schedule B, Table 3 – 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 RO permeate	2 km radius from well site
-26°.00'01.09"S 149°.04'14.44"E	DRP-WI-2	Precipice Sandstone	Treated RO permeate	2 km radius from well site
-25°.59'59.89"S 149°.04'16.89"E	DRP-WI-3	Precipice Sandstone	Treated RO permeate	2 km radius from well site

- (B42) If environmental harm has been caused or threatened as a result of the fluid injection activity(ies), fluid injection must cease immediately.

Well Integrity

- (B43) 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*.
- (B44) 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.
- (B45) 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

- (B46) Fluid used in well injection must comply with the contaminant limits prescribed in Schedule B, Table 4 – Specific Contaminant Limits in Injection Fluid.

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Schedule B, Table 4 – Specific Contaminant Limits in Injection Fluid

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

*Measured at the point of injection

(B47) 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

(B48) 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)

(B49) 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 reinjected 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 1997 and the Queensland Water Quality Guidelines 2006;
- (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;

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- (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

- (B50) 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

- (B51) 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.
- (B52) 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 (B50);
 - (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 (B52) to (B55) inclusive.

Well Closure

- (B53) A Well Closure Plan must be submitted to the administering authority within six (6) months prior to the cessation of fluid injection at a well.

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- (B54) 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.
- (B55) Actions outlined in the well closure plan must be completed within three (3) months of the cessation of fluid injection at the injection well.
- (B56) 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 (B53) to (B54) 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

- (B57) A fluid injection cessation report which has been certified by a suitably qualified person must be submitted to the administering authority within two (2) months of completion of fluid injection activities.
- (B58) 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

- (B59) The Department of Environment and Heritage Protection 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 4 - Specific Contaminant Limits for Injection Fluid.

Declared wild river areas

- (B60) If the petroleum authority is in or partly within a declared wild river area, or a moratorium is in place under the *Wild Rivers Act 2005*, the holder of the environmental authority must ensure that petroleum activities within the (proposed) wild river area are conducted in accordance with the conditions in the wild river declaration for the area that state they are for petroleum activities.

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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	7.5	138	2.07	Brine Storage
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
Taloona Cell 1	4.2	113	3	Aggregation
Taloona Cell 2	2.8	68	3	Evaporation
Taloona 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.

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- (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 hazard 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 that must comply with the standard environmental conditions in the *Code of Environmental Compliance for Environmental Authorities for High Hazard Dams Containing Hazardous Waste*.
- (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 and the area rehabilitated to a final land use 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 Hazard Category

- (C11) The hazard category of any structure must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- (C12) The hazard 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 hazard structure, at least biennially after its construction;
 - (d) for an existing low hazard dam, within 120 business days of 19 July 2012.
- (C13) A hazard assessment report and certification must be prepared for any structure assessed and the report may include a hazard assessment for more than one structure.
- (C14) On receipt, one paper copy and one electronic copy of the hazard 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 Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

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Construction of Low Hazard Dam to Contain Wetting Front

- (C16) Where a dam is assessed as low hazard, 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 hazard 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 Hazard Dams

- (C19) The condition of all low hazard 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 hazard 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 Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- (C21) Construction of a regulated structure is prohibited unless:
- (a) a hazard 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 Hazard Categories and Hydraulic Performance of Dams", 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 Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time; and

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- (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 Hazard Categories and Hydraulic Performance of Dams*, 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 Hazard Categories and Hydraulic Performance of Dams*, 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 hazard category of the structure; and
 - 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.

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- (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

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- (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 hazard 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 hazard 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 Hazard Categories and Hydraulic Performance of Dams*, 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 Hazard Categories and Hydraulic Performance of Dams*, 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.

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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 hazard 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, hazard 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;
 - (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 hazard category of the dam as assessed using the "Manual for Assessing Hazard Categories and Hydraulic Performance of Dams", 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);

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- 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) turbidity [NTU];
 - (d) total dissolved solids [mg/L];
 - (e) temperature [$^{\circ}\text{C}$];
 - (f) dissolved oxygen [mg/L];
 - (g) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L];
 - (h) sodium adsorption ratio (SAR);
 - (i) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L];
 - (j) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L];
 - (k) silica [mg/L];

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- (l) dissolved and total metals (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 phosphorus [mg/L];
 - (n) ammonia, nitrate, nitrite as nitrogen [mg/L];
 - (o) total petroleum hydrocarbons [$\mu\text{g/L}$];
 - (p) BTEX (as benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene) [$\mu\text{g/L}$];
 - (q) polycyclic aromatic hydrocarbons (including but not necessarily being limited to naphthalene, phenanthrene, benzo[a]pyrene) [$\mu\text{g/L}$];
 - (r) chlorophyll a [$\mu\text{g/L}$]; and
 - (s) total cyanobacteria biovolume [cells/mg/L]; and
 - (t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].
- (C54) Water quality samples of regulated dams must be taken from at least three (3) 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.

Release

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 – Land Disposal (Greater than 21 EP)

- (D5) 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

Release

Monitoring

- (D6) 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.
- (D7) 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.
- (D8) 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;
- (D9) 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.
- (D10) 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

- (D11) 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

- (D12) 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*.
- (D13) The holder of this authority must ensure that all flammable and combustible liquids are stored and handled in accordance with AS 1940.

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Pipeline Activities

- (D14) The holder of this authority must undertake activities in accordance with the AS 2885 for pipeline assets that are specified within the standard.
- (D15) 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

- (D16) 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
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 (µS/cm)	2900

Release

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 are permitted within 500 metres of a Category B ESA.

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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:

- (a) within the geographical bounds identified in Schedule E, Table 2; and
- (b) 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
	Latitude	Longitude	
Access track to Eurombah Creek Gas Processing Facility (GPF)	-25.911113	149.117426	0.30 ha
	-25.911365	149.117157	
	-25.911799	149.116994	
	-25.912327	149.116953	
	-25.912292	149.11666	
	-25.911747	149.116701	
	-25.911285	149.116857	
	-25.91111	149.116992	
	-25.910931	149.117194	
	-25.913689	149.197225	0.10 ha
	-25.913741	149.197519	
	-25.913904	149.197421	
	-25.914197	149.197409	
	-25.914145	149.197115	
	-25.913849	149.19712	
	-25.914506	149.197494	
	-25.91582	149.197782	
	-25.915881	149.19749	
	-25.914567	149.197203	

(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, 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;

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- (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, within a signed Deed of Agreement between the holder and 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) The offset must be provided in accordance with:
- (f) the *Queensland Biodiversity Offset Policy* or latest version thereof; and
 - (g) a signed Deed of Agreement.
- (E9) A Deed of Agreement must be implemented.

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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 (5) 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 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;

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- (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 E, 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
6:00 pm – 10:00 pm	$L_{Aeq,adj,15\ min}$	40 dBA	38 dBA	35 dBA
Noise from drilling activities undertaken from 10:00pm – 7:00am	$L_{Aeq,adj,15\ min}$	30 dBA (measured indoors any sensitive receiver)		
Noise from fixed plant in gas fields undertaken from 10:00pm – 7:00am	$L_{Aeq,adj,15\ min}$	28 dBA (measured indoors any sensitive receiver)		
10:00 pm – 6:00 am	Max $L_{pA, 15\ mins}$	55 dBA		

Noise limits in Table 1 are taken to be measured noise levels outside a sensitive receptor unless stated otherwise.

L_{Aeq} and Max L_{pA} are to be measured over any 15 minute period

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

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- (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:
- (a) 60 dB(C) measured outside the sensitive receptor; and
 - (b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
 - (c) 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;

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- (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.

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SCHEDULE G – AIR

Fuel Burning

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

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SCHEDULE H – WASTE

- (H1) Regulated waste must be handled and transferred in a proper and efficient manner to prevent any leakage or spillage of waste.
- (H2) No regulated waste is permitted to be disposed of on-site.
- (H3) All regulated waste removed from the site must be removed by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994* and sent to a facility licensed to accept such waste.
- (H4) When regulated waste is removed from within the boundary of the environmental authority and transported by the holder of this environmental authority, a record must be kept of the following:
 - (a) date of waste transport,
 - (b) quantity of waste removed and transported,
 - (c) type of waste removed and transported,
 - (d) route selected for transport of waste,
 - (e) quantity of waste delivered, and
 - (f) any incidents (e.g. spillage) that may have occurred on route.

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SCHEDULE I – REHABILITATION

- (I1) 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 (3) 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 (3) 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 (I1)(b)(i) and (I1)(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

- (I2) 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.
- (I3) 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

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- 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 analogue¹⁰ 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 type¹¹ 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 ≥ 10 cm diameter (count and number per hectare);
 - 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;

¹⁰ 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.

¹¹ 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.

- 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, resspreading 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. on going maintenance program for rehabilitated areas; and
 - xviii. rehabilitation monitoring program as required by conditions (I13) and (I14) 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 (3) months for the rehabilitation of buried pipelines and not greater than nine (9) months for any other significantly disturbed area.

(I4) The Rehabilitation Plan must be implemented.

Progressive Rehabilitation for Significantly Disturbed Land

- (I5) Pipelines trenches must be backfilled immediately after pipe laying and rehabilitated commenced as soon as practicable but not longer than three (3) months after backfilling has been completed.
- (I6) 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.
- (I7) 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.
- (I8) 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 (9) months following the completion of any construction or operational works associated with the petroleum activity(ies).

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- (I9) 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.
- (I10) 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.
- (I11) Notwithstanding condition (I1), all buried pipelines must be decommissioned in accordance with the requirements of Australian Standard 2885, as amended from time to time.
- (I12) 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).

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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 (3) consecutive years.

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SCHEDULE J – WELL CONSTRUCTION, MAINTAINANCE 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);

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- (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

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- (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 (2) 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 (2) kilometre radius from the location of the hydraulic fracturing initiation point; and
 - (d) 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) [$\mu\text{g/L}$];

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- (q) sodium hypochlorite [mg/L];
- (r) sodium hydroxide [mg/L];
- (s) formaldehyde [mg/L];
- (t) ethanol [mg/L]; and
- (u) 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 (6) months subsequent to hydraulic fracturing activities being undertaken; then
 - (b) annually for the first five (5) years subsequent to hydraulic fracturing activities being undertaken or until analytes and physico-chemical parameters listed in conditions (J18)(b), (J18)(n) – (J18)(u) are not detected in concentrations above baseline bore monitoring data on two (2) 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.

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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.

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SCHEDULE L – NOTIFICATION PROCEDURES

- (L1) The Department of Environment and Heritage Protection Pollution Hotline (telephone: 1300 130 372) and any affected landholder, occupier or their nominated representative must be telephoned as soon as reasonably practicable, but within 24 hours after becoming aware of:
- (a) a release of contaminants as provided for in condition (L3); or
 - (b) any event where environmental harm (excluding environmental nuisance) has been caused or may be caused; or
 - (c) any detection of restricted stimulation fluids from stimulation fluid monitoring; or
 - (d) any analyses result from baseline bore, well or stimulation impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource; or
 - (e) an injection or formation pressure reading exceeding the pressure limits calculation in accordance with condition (A16); or
 - (f) migration of injected gas out of the target formation; or
 - (g) hydraulic connection or potential hydraulic connection with any groundwaters; or
 - (h) detectable limits of the injected gas in the air; or
 - (i) the detection of groundwater contaminants that were not detected in background samples.
- (L2) Notwithstanding condition (L1), the Department of Environment and Heritage Protection Pollution Hotline (telephone: 1300 130 372) must be telephoned as soon as reasonably practicable, but within 24 hours after becoming aware of:
- (a) any non-compliance with any condition of this environmental authority other than in relation to a release of contaminants; or
 - (b) a potential or actual loss of structural or hydraulic integrity of a dam; or
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level; or
 - (d) when a regulated dam will not have available storage to meet the design storage allowance on the 1 November of any year; or
 - (e) any incident where there is a potential or actual loss of well integrity (e.g. when the annulus pressure during hydraulic fracturing increases by more than 3.5 MPa from the pressure immediately preceding hydraulic fracturing).
- (L3) Subject to condition (L1), spills of contaminants (including but not limited to hydrocarbons, coal seam gas water, stimulation fluids or any mixtures) of the following volumes or kind must be reported to the Administering Authority:
- (a) releases of any volume of contaminants to water;
 - (b) releases of volumes of contaminants to land greater than:
 - i. 200L of hydrocarbons; or
 - ii. 200 L of stimulation additives; or
 - iii. 500 L of stimulation fluids; or
 - iv. 1000 L of brine; or
 - v. 5 000 L of coal seam gas water;
 - (c) any other release not authorised under this environmental authority which has caused or has the potential to cause serious or material environmental harm.

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- (L4) The notification of emergencies or incidents as required by conditions (L1), (L2) and (L3) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident (GDA94);
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (e.g. grazing, pasture, forest etc) and / or the name of any relevant waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) a description of whether stock and / or wildlife were actually or potentially exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination / root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the Administering Authority.
- (L5) Within 10 business days following the initial notification, unless a longer time is agreed to by the Administering Authority, a written report must be provided to the Administering Authority, including the following (where relevant to the emergency or incident):
- (a) the information required by condition (L4);
 - (b) the root cause of the emergency or incident;
 - (c) the confirmed quantities and types of any contaminants involved in the incident;
 - (d) results and interpretation of any analysis of samples taken at the time of the emergency or incident (including the analysis results of any impact monitoring);
 - (e) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;
 - (f) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
 - (g) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
 - (h) actions and / or procedural changes to prevent a recurrence of the emergency or incident.

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- (L6) 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.
- (L7) As soon as reasonably practicable after the notification in condition (L6), 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.
- (L8) 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.
- (L9) If groundwater contamination caused by the petroleum activity(ies) is encountered, the following must be reported to satisfy requirements under condition (L8):
- (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.

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SCHEDULE M – DEFINITIONS

Acid sulfate soils means soil or sediment containing highly acidic soil horizons or layers affected by the oxidation of iron sulfides (*actual acid sulfate soils*) and / or soil or sediment containing iron sulfides or other sulfidic material that has not been exposed to air and oxidised (*potential acid sulfate soils*). 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 the Queensland Government 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 *Environmental Protection Act 1994* – 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 a given rainfall total accumulated over a given duration will be exceeded in any one year.

Annual return means the return required by the annual notice (under section 316 of the *Environmental Protection Act 1994*) for the section 86(2) licence that applies to the development approval.

Approval for the purpose of Schedule B – Water, means an Information Notice pursuant to section 325 of the *Water Supply (Safety and Reliability) Act 2008*, dated 9 January 2012, given to Australia Pacific LNG Pty Limited by the Administering Authority of that Act.

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 *Environmental Protection Act 1994* 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.

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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 *Environmental Protection Act 1994*,
 - 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 Heritage Protection'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 *Acts Interpretation Act 1954* 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 Section 25 of the *Environmental Protection Regulation 2008*.

Category B Environmentally Sensitive Area means any area listed in Section 26 of the *Environmental Protection Regulation 2008*.

Category C Environmentally Sensitive Area means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the *Nature Conservation (Koala) Conservation Plan 2006*;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Declared catchment areas under the *Water Act 2000*;
- Resources reserves under the *Nature Conservation Act 1992*;
- An area identified as "Essential Habitat" under the *Vegetation Management Act 1999* for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*.

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.

Coal seam gas (CSG) 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. CSG water is a waste, as defined under s13 of the *Environmental Protection Act 1994*.

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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.

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 *not* 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).

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 Hazard Categories and Hydraulic Performance of Dams*, 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.

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Document has the meaning in the *Acts Interpretation Act 1954* 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).

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 dam means an existing evaporation, aggregation or brine dam and any dam that is identified in Schedule C, Table 1 – Existing Spring Gully Dams and Evaporation Ponds 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.

Floodplain has the meaning in the *Water Act 2000* 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.

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.

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Groundwater means subsurface water, generally saturating the soil or rock in which it occurs.

$L_{A \max, \text{adj}, T}$ 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.)

Hazard category means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

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.

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.

$L_{Aeq, \text{adj}, 15 \text{ mins}}$ 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.

$L_{A90, \text{adj}, 15 \text{ mins}}$ 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

Lake means:

- a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- the bed and banks and any other element confining or containing the water.

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 *Water Act 2000*.

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 (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.

Low hazard dam means any dam that is not classified as high or significant as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

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Max $L_{pZ, 15 \text{ min}}$ means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

Max $L_{pA, 15 \text{ min}}$ 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 *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* prepared by the Department of Environment and Heritage Protection, as amended from time to time.

medium term noise event is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) 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.

Month has the meaning in the *Acts Interpretation Act 1954* and means a calendar month and is a period starting at the beginning of any day of one (1) 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.

Petroleum activities means activities authorised to take place on land subject to a petroleum authority, including rehabilitation and decommissioning activities.

Petroleum authority is—

- (a) a 1923 Act petroleum tenure granted under the *Petroleum Act 1923*; or
- (b) an authority to prospect, petroleum lease, data acquisition authority, water monitoring authority, petroleum facility licence, survey licence or pipeline licence granted under the *Petroleum and Gas (Production and Safety) Act 2004*; or
- (c) a licence, permit, pipeline licence, primary licence, secondary licence or special prospecting authority granted under the *Petroleum (Submerged Lands) Act 1982*.

Regulated dam means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, 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 hazard category as assessed using the *Manual for Assessing Hazard 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 1988 (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.

Reverse Osmosis (RO) Permeate - means the treated coal seam gas water produced from the Spring Gully Water Treatment Facility.

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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 (7) 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 Environmental Protection Regulation 2008.

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.

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.

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.

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.

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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 *Professional Engineers Act 2002*, 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.

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).

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).

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 *Water Act 2000* and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

Wetland means a wetland as defined under the Queensland Wetlands Program and are areas of permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres. To be classified as a wetland, the area must have one or more of the following attributes:

- at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
- the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
- the substratum is not soil and is saturated with water, or covered by water at some time.

For the purposes of Chapter 5A activities, wetlands do not include springs and watercourse and those wetlands that are defined in the document entitled *Wetland Mapping and Classification Methodology* (Department of Environment and Resource Management, 2005) as:

- H2M1 Riverine or ex-riverine (lacustrine) water bodies associated with dams and weirs located in a channel;
- H2M3p Ponded pastures;
- H2M5 Palustrine / lacustrine water bodies where ecological character has changed due to gross mechanical disturbance (e.g. cropping);
- H2M6 Palustrine / lacustrine water bodies that have been converted, completely or mostly, to a ring tank or other controlled storage;
- H2M7 Riverine water bodies that have been converted mostly to canals or irrigation channels;

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- H3C1 Artificial stand-alone water storages not within a natural water body or channel; or
- H3C2 Artificial Channel drain / canal –bore drains, swales, **bore**s and irrigation channel overflows / ponding.

Wild river areas may include the following–

- (a) high preservation areas;
- (b) preservation areas;
- (c) floodplain management areas;
- (d) subartesian management areas.

Year means a period of 12 months.

12 months daily average means average of samples taken over 12 months.

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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 ¹²	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

¹² Metals should be analysed in accordance with recognised test methods by a NATA certified laboratory.

APPENDIX 2 – Map - Spring Gully Discharge Monitoring Points



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Department of Environment and Heritage Protection

Permit¹

Environmental Protection Act 1994

This environmental authority is issued by the administering authority under section 211 of the *Environmental Protection Act 1994*.

Permit¹ number: EPPG00928713

Santos Reference: PEN100178208

Project Name: Fairview Project Area

Environmental authority takes effect: 20 February 2014.

The anniversary date of this environmental authority is **30 January**.

An annual return and the payment of the annual fee will be due each year on this day.

The environmental authority is subject to the attached schedules of conditions.

Environmental authority holders		
Principal Holder:	Santos TOGA Pty Ltd ACN: 077 536 871	Registered Address: Ground Floor - Santos Centre 60 Flinders Street ADELAIDE SA 5000
Joint Holders:	Santos TPY CSG Corp Santos Queensland Corp PAPL (Upstream) Pty Ltd Total E&P Australia II	Santos TYP Corp Bronco Energy Pty Limited Total E&P Australia KGLNG E&P Pty Ltd

Environmentally Relevant Activity	Location
Non-mining resource activities	Petroleum Leases (PL): 90, 91, 92, 99, 100 & 232 Petroleum Pipeline Licences (PPL): 76 & 92

Medina Hasan

Signature

20/2/14

Date

Medina Hasan

Delegate of the administering authority
Environmental Protection Act 1994

Enquiries:

Energy Assessment
Level 7, 400 George Street
BRISBANE QLD 4000
GPO Box 2454
BRISBANE QLD 4001
Phone: (07) 3330 5715
Fax: (07) 3330 5634

¹ Permit includes licences, approvals, permits, authorisations, certificates, sanctions or equivalent/similar as required by legislation administered by the Department of Environment and Heritage Protection.

^[1] See section 493A of the Act.



Additional information for applicants

Environmentally relevant activities

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

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

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

Contaminated land

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

Responsibilities under the Environmental Protection Act 1994

Separate to the requirements of standard conditions, the holder of the environmental authority must also meet their obligations under the *Environmental Protection Act 1994*, and the regulations made under that Act. For example, the holder must be aware of the following provisions of the *Environmental Protection Act 1994*.

General environmental duty

Section 319 of the *Environmental Protection Act 1994* states that we all have a general environmental duty. This means that we are all responsible for the actions we take that affect the environment. We must not carry out any activity that causes or is likely to cause environmental harm unless we take all reasonable and practicable measures to prevent or minimise the harm. To decide what meets your general environmental duty, you need to think about these issues:

- the nature of the harm or potential harm
- the sensitivity of the receiving environment
- the current state of technical knowledge for the activity
- the likelihood of the successful application of the different measures to prevent or minimise environmental harm that might be taken
- the financial implications of the different measures as they would relate to the type of activity.

It is not an offence not to comply with the general environmental duty, however maintaining your general environmental duty is a defence against the following acts:

- (a) an act that causes serious or material environmental harm or an environmental nuisance
- (b) an act that contravenes a noise standard
- (c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG.

More information is available on the Department of Environment and Heritage Protection website www.ehp.qld.gov.au.

Duty to notify

Section 320 of the *Environmental Protection Act 1994* explains the duty to notify. The duty to notify applies to all persons and requires a person or company to give notice where serious or material environmental harm is caused or threatened. Notice must be given of the event, its nature and the circumstances in which the event happened. Notification can be verbal, written or by public notice depending on who is notifying and being notified.

The duty to notify arises where:

- a person carries out activities or becomes aware of an act of another person arising from or connected

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to those activities which causes or threatens serious or material environmental harm

- while carrying out activities a person becomes aware of the happening of one or both of the following events:
 - the activity negatively affects (or is reasonably likely to negatively affect) the water quality of an aquifer
 - the activity has caused the unauthorised connection of 2 or more aquifers.

For more information on the duty to notify requirements refer to the guideline *Duty to notify of environmental harm (EM467)*.

Notifiable activities

It is a requirement under the *Environmental Protection Act 1994* that if an owner or occupier of land becomes aware that a Notifiable Activity (as defined by Schedule 4 of the *Environmental Protection Act 1994*) is being carried out on the land or that the land has been affected by a hazardous contaminant, they must, within 22 business days after becoming so aware, give notice to the administering authority.

Some relevant offences under the Environmental Protection Act 1994

Non-compliance with a condition of an environmental authority (section 430)

Section 430 of the *Environmental Protection Act 1994* requires that a person who is the holder of, or is acting under, an environmental authority must not wilfully contravene, or contravene a condition of the authority.

Environmental authority holder responsible for ensuring conditions complied with (section 431)

Section 431 of the *Environmental Protection Act 1994* requires that the holder of an environmental authority must ensure everyone acting under the authority complies with the conditions of the authority. If another person acting under the authority commits an offence against section 430, the holder also commits an offence, namely, the offence of failing to ensure the other person complies with the conditions.

Causing serious or material environmental harm (sections 437–39)

Material environmental harm is environmental harm that is not trivial or negligible in nature. It may be great in extent or context or it may cause actual or potential loss or damage to property. The difference between material and serious harm relates to the costs of damages or the costs required to either prevent or minimise the harm or to rehabilitate the environment. Serious environmental harm may have irreversible or widespread effects or it may be caused in an area of high conservation significance. Serious or material environmental harm excludes environmental nuisance.

Causing environmental nuisance (section 440)

Environmental nuisance is unreasonable interference with an environmental value caused by aerosols, fumes, light, noise, odour, particles or smoke. It may also include an unhealthy, offensive or unsightly condition because of contamination.

Depositing a prescribed water contaminant in waters (section 440ZG)

Prescribed contaminants include a wide variety of contaminants listed in Schedule 9 of the *Environmental Protection Act 1994*.

It is your responsibility to ensure that prescribed contaminants are not left in a place where they may or do enter a waterway, the ocean or a stormwater drain. This includes making sure that stormwater falling on or running across your site does not leave the site contaminated. Where stormwater contamination occurs you must ensure that it is treated to remove contaminants. You should also consider where and how you store material used in your processes onsite to reduce the chance of water contamination.

Placing a contaminant where environmental harm or nuisance may be caused (section 443)

A person must not cause or allow a contaminant to be placed in a position where it could reasonably be expected to cause serious or material environmental harm or environmental nuisance.

Some relevant offences under the Waste Reduction and Recycling Act 2011

Littering (section 103)

Litter is any domestic or commercial waste and any material a person might reasonably believe is refuse, debris or rubbish. Litter can be almost any material that is disposed of incorrectly. Litter includes cigarette

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butts and drink bottles dropped on the ground, fast food wrappers thrown out of the car window, poorly secured material from a trailer or grass clippings swept into the gutter. However, litter does not include any gas, dust, smoke or material emitted or produced during, or because of, the normal operations of a building, manufacturing, mining or primary industry.

Illegal dumping of waste (section 104)

Illegal dumping is the dumping of large volumes of litter (200L or more) at a place. Illegal dumping can also include abandoned vehicles.

Responsibilities under other legislation

An environmental authority pursuant to the *Environmental Protection Act 1994* does not remove the need to obtain any additional approval for the activity that might be required by other State and/or Commonwealth legislation. Other legislation for which a permit may be required includes but is not limited to the:

- *Aboriginal Cultural Heritage Act 2003*
- contaminated land provisions of the *Environmental Protection Act 1994*
- *Fisheries Act 1994*
- *Forestry Act 1959*
- *Nature Conservation Act 1992*
- *Petroleum and Gas (Production and Safety) Act 2004 / Petroleum Act 1923*
- *Queensland Heritage Act 1992*
- *Sustainable Planning Act 2009*
- *Water Supply (Safety and Reliability) Act 2008*
- *Water Act 2000*

Applicants are advised to check with all relevant statutory authorities and comply with all relevant legislation.

An environmental authority for petroleum activities is not an authority to impact on water levels or pressure heads in groundwater aquifers in or surrounding formations. There are obligations to minimise or mitigate any such impact under other Queensland Government and Commonwealth Government legislation.

Environmental Authority Conditions

This environmental authority consists of the following Schedules:

Schedule A	General Conditions
Schedule B	Water
Schedule BB	Groundwater
Schedule BE	Fluid Injection
Schedule C	Regulated Structures
Schedule D	Land
Schedule E	Disturbance to Land
Schedule F	Environmental Nuisance
Schedule G	Air
Schedule H	Waste
Schedule I	Rehabilitation
Schedule J	Well Construction, Maintenance and Stimulation Activities
Schedule K	Community Issues
Schedule L	Notification Procedures
Schedule M	Definitions
Appendix 1	Existing Regulated Dams
Appendix 2	Plans referenced in Schedule B, Table 1 – Authorised Works in a Watercourse or within 200m of Springs
Appendix 3	Plans referenced in Schedule E, Table 2 – Authorised Disturbance

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SCHEDULE A – GENERAL CONDITIONS

Scope

- (A1) The following **specified relevant activities** are authorised under this environmental authority:
- (a) **Environmentally relevant activity (ERA) 8(3) – Chemical Storage** – storing 500m³ or more of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 subsection (1)(c).
 - (b) **ERA 14 (1) – Electricity Generation** – generating electricity by using gas at a rated capacity of 10MW electrical or more
 - (c) **ERA 15 – Fuel Burning** – consists of using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour
 - (d) **ERA 58 – Regulated Waste Treatment** – consists of operating a facility for receiving and treating regulated waste or contaminated soil to render the waste or soil non-hazardous or less hazardous
 - (e) **ERA 60 (1)(d) – Waste Disposal** – operating a facility for disposing of, in a year, more than 200000t of any combination of regulated waste, general waste and limited regulated waste and <5t of untreated clinical waste (if in a scheduled area)
 - (f) **ERA 63 (1)(b)(i) – Sewage Treatment** - Operating sewage treatment works, other than no release works, with a total daily peak design capacity of more than 100EP to 1500EP
 - (g) **ERA 63(1)(b)(ii) Sewage Treatment** - Operating sewage treatment works, other than no release works, with a total daily peak design capacity of more than 100EP to 1500EP
- (A2) This environmental authority authorises the carrying out of the authorised environmentally relevant activities subject to the conditions of this environmental authority.
- (A3) This environmental authority does not authorise a relevant act^[1] to occur in carrying out an authorised relevant activity unless a condition of this environmental authority expressly authorises the relevant act to occur.¹

Authorised Petroleum Activities

- (A4) In the carrying out of the petroleum activities, the number and maximum size for each of the specified petroleum activities listed in *Schedule A - Table 1 – Authorised Petroleum Activities* must not be exceeded for each petroleum tenure.

Schedule A, Table 1 – Authorised Petroleum Activities

Tenure numbers	Petroleum activities and infrastructure	Number of existing activities	Number of proposed activities	Maximum Size (where applicable)
PL90, PL91, PL92, PL99, PL100, PL232, PPL76, PPL92	Seismic 2D		1200km	1200 ha
	Seismic 3D		80km	80 ha
	Total Wells	220	694	2190 ha
	- Exploration Wells (indicative)	35	20	
	- Appraisal Wells (indicative)	5	5	
	- Development Wells (indicative)	180	669	
	Injection Wells FV77 and FV82	2	0	6 ha
	Compressor Station(s)	3 CS1 CS2 CS3	2 F-HCS-04 F-HCS-05	140 ha
	Regulated Structure(s) ≥400 megalitres	0	5	250 ha
	Regulated Structure(s) <400 megalitres	2	35	220 ha
	Low Hazard Dam(s)	500	4000	30 ha
	Water treatment facilities (Reverse Osmosis Plants and Associated Water Amendment Facilities)	2	5	1 x 25 ML/d 1 x 10 ML/d 1 x 6 ML/d 1 x 4 ML/d 1 x 2 ML/d 2 x 1.2 ML/d
	Brine Encapsulation Facilities	0	0	0
	Sewage Treatment Plant(s)	0	3	≤ 100 equivalent persons (EP)
		2	2	≤ 450EP

Prevent or Minimise Likelihood of Environmental Harm

- (A5) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Maintenance of Measures, Plant and Equipment

- (A6) All measures, plant and equipment must be:
- (a) installed to ensure compliance with the conditions of this environmental authority;
 - (b) maintained in their proper and effective condition; and
 - (c) operated in a proper and effective manner.
- (A7) No change, replacement or alteration of any plant or equipment is permitted if the change, replacement or alteration materially increases, or is likely to increase, the environmental harm caused by the petroleum activity.

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Financial Assurance

- (A8) The holder of this authority must provide a financial assurance from time to time, in the amount and form required by the administering authority for the authorised petroleum activities.
- (A9) The financial assurance is to remain in force until the administering authority is satisfied that no claim is likely to be made on the assurance.
- (A10) The calculation of financial assurance must be in accordance with the most recent version of the administering authority's Guideline "Financial Assurance under the Environmental Protection Act 1994".
- (A11) Prior to any changes in petroleum activities which would result in an increase to the maximum disturbance since the last financial assurance calculation was submitted, the holder of the environmental authority must submit, and the administering authority must have approved, an application to amend the financial assurance.

Third Party Audit

- (A12) A third party auditor, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A13) Notwithstanding condition (A12), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.
- (A14) An audit report must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A15) Any recommendations arising from the audit report must be acted upon by:
 - (a) investigating any non-compliance issues identified; and
 - (b) as soon as reasonably practicable, implementing measures or taking necessary action to ensure compliance with the requirements of this environmental authority.
- (A16) A written response must be attached to the audit report detailing the actions taken on stated dates:
 - (a) by the holder to ensure compliance with this environmental authority; and
 - (b) to prevent a recurrence of any non-compliance issues identified.

Contingency Plan for Emergency Environmental Incidents

- (A17) Responses to environmental emergency incidents must be undertaken in accordance with the *GLNG Upstream – Contingency Plan for Emergency Environmental Incidents* dated June 2011, or any subsequent revised versions of this plan.
- (A18) The Contingency Plan for Emergency Environmental Incidents must include, but not necessarily be limited to:
 - (a) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity(ies) authorised to be carried out under this environmental authority;
 - (b) identification of the types of environmental incidents that may occur, relevant to the petroleum activity(ies) authorised to be carried out under this environmental authority;
 - (c) response procedures to minimise the extent and duration of environmental harm caused by environmental emergency incidents;
 - (d) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused;
 - (e) communication procedures and lines of communication within and beyond the organisation (including Local Government) to be employed in responding to environmental emergency

- incidents;
- (f) the resources to be used in response to environmental emergency incidents;
 - (g) procedures to investigate the cause of any incidents (including releases) or near misses and where necessary, the remedial actions to be implemented to reduce the likelihood of recurrence of similar events;
 - (h) procedures for responding to incidents resulting from stimulation activities, including specific rectification measures in the event of non-routine stimulation events.
 - (i) plans for restoring loss of well mechanical integrity so as to prevent environmental harm;
 - (j) procedures to avoid / minimise discharges resulting from any overtopping or loss of structural integrity of a dam;
 - (k) procedures to respond to a regulated dam reaching mandatory reporting level;
 - (l) procedures to respond to a regulated dam reaching exceeding its design storage allowance;
 - (m) a receiving environment monitoring program, to be specifically implemented in the event of a release to waters or land to examine / assess environmental impacts. For monitoring of waters, this program must include upstream, downstream and impact site monitoring. For soils monitoring, three replicate samples must be taken at depth intervals of 0-10 cm, 20-30 cm and 50-60 cm at both an analogue and the impact site as a minimum;
 - (n) the provision and availability of documented procedures to staff attending any emergency environmental incident to enable them to effectively respond;
 - (o) training of staff that will be called upon to respond to emergency environmental incidents to enable them to effectively respond;
 - (p) timely and accurate reporting of the circumstance and nature of emergency environmental incidents to the administering authority and any affected landholder, occupier and / or their nominated representative in accordance with conditions of this environmental authority; and
 - (q) procedures for accessing monitoring points during emergency environmental incidents.

Infrastructure

- (A19) The following infrastructure must be clearly and permanently marked for the life of the petroleum activity(ies) with a unique reference name / number in such a way that it is clearly observable:
- (a) regulated dams and low hazard dams;
 - (b) exploration, appraisal and development wells;
 - (c) water treatment facilities;
 - (d) sewage treatment facilities;
 - (e) authorised discharge points to air and waters;
 - (f) any chemical storage facility associated with the environmentally relevant activity of chemical storage; and
 - (g) compressor stations.

Monitoring

- (A20) All monitoring under this environmental authority must be conducted and certified by a suitably qualified person.
- (A21) All laboratory 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, unless NATA accredited tests are not available.
- (A22) Any management or monitoring plans, systems or programs required to be developed and implemented by a condition of this environmental authority must be reviewed for performance and amended as required but not less than once every three (3) years in accordance with the requirements for the particular plans, systems, programs and procedures in the conditions of this environmental authority.
- (A23) An annual report must be prepared each year and submitted to the administering authority in a form requested by the administering authority. This report must include but not necessarily be limited to:

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- (a) the results of the Seepage Monitoring Program that is required by the conditions of this environmental authority;
- (b) a summary of:
 - (i) any investigations required for the Seepage Monitoring Program prescribed under this environmental authority;
 - (ii) the regulated dam register in the approved format that is required by the conditions of this environmental authority;
 - (iii) the results of annual regulated dam water quality monitoring that is required by the conditions of this environmental authority;
 - (iv) the results of vibration and blast monitoring required by the conditions of this environmental authority;
 - (v) any well closure reports that are required by the conditions of this environmental authority, where applicable;
 - (vi) the results of any baseline or stimulation impact monitoring program that is required by this environmental authority, where applicable;
 - (vii) non **NATA accredited** laboratory testing methods, where applicable;
 - (viii) in relation to brine injection, the results of monitoring including monthly summaries of injection conditions, commentary on changes to injection fluid characteristics or sources, annulus performance, packer isolation test, mechanical integrity and all other pertinent information;
- (c) the management criteria report required by section 316A of the *Environmental Protection Act 1994*;
- (d) if prepared for the subject annual return period, any third party audit report and written response to said report that is required by this environmental authority;
- (e) a comparison of the previous 12 **months** monitoring results to both the limits set in this environmental authority and to relevant prior results including data analyses and interpretation to assess the nature and extent of any contamination and the level of environmental harm caused as a result of the contamination and the environmentally relevant activity(ies); and
- (f) details of any exceedences with the conditions of this environmental authority and the dates and times these exceedences were reported to the administering authority;
- (g) an outline of actions taken to minimise the risk of environmental harm from any circumstance, condition or elevated contaminant level identified by the monitoring or recording programs as required by condition (A20).

Surface Water Sampling Methodology

- (A24) The methods of water sampling required by this environmental authority must comply with that set out in the latest edition of the *Queensland Monitoring and Sampling Manual* as amended from time to time.

Groundwater Sampling Methodology

- (A25) The methods of groundwater sampling required by this environmental authority must comply with the latest edition of the *Queensland Monitoring and Sampling Manual*, AS/NZS 5667:11 1998 *Water Sampling Guidelines – Part 11 Guidance on sampling groundwater*, and the Australian Government's *Groundwater Sampling and Analysis – A Field Guide* (2009:27 GeoCat #6890.1) as relevant and as amended from time to time.

Noise Sampling Methodology

- (A26) Noise must be measured in accordance with the prescribed standards in the *Environmental Protection Regulation 2008*.

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Documentation and Records Management

- (A27) A record of all documents required by this environmental authority must be kept for a minimum of five (5) years.
- (A28) All plans and monitoring programs required by this environmental authority must be certified by a suitably qualified person.
- (A29) All plans and monitoring programs under this environmental authority must be implemented.

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SCHEDULE B – WATER

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

Erosion and Sediment Control Plan

- (B2) Sediment and erosion control measures must be undertaken in accordance with *GLNG Project Upstream Activities Erosion and Sediment Control Manual GLNG ESC Manual* dated 21 July 2011 or any subsequent revised versions of this plan.
- (B3) The GLNG Project Upstream Activities Erosion and Sediment Control Manual must include but not necessarily be limited to:
- (a) a risk assessment identifying areas on the relevant resource authority(ies) where the risk of erosion from stormwater and overland flows is greatest;
 - (b) definition of catchments, drainage systems, receiving environments, land-use patterns, land-use activities and potential contaminants;
 - (c) managing and / or diverting uncontaminated stormwater run-off around areas disturbed by the petroleum activity(ies) or where contaminants or wastes are stored or handled that may contribute to contamination of waters;
 - (d) ensuring that contaminated stormwater runoff and incident rainfall is collected, treated, reused, or released in accordance with the conditions of this environmental authority;
 - (e) roofing or minimising the size of areas where contaminants or wastes are stored or handled;
 - (f) revegetating disturbed areas as soon as practicable after the completion of works;
 - (g) using materials and or processes (e.g. dry absorbents) to clean up spills that will minimise contamination of waters;
 - (h) placing erosion and sediment control structures to minimise erosion of disturbed areas and prevent the contamination of waters;
 - (i) an inspection and maintenance program for the erosion and sediment control measures;
 - (j) provision for adequate access to maintain all erosion and sediment control measures especially during the wet season from November to April;
 - (k) additional erosion and sediment control measures for construction of wells and pipelines on slopes >10%;
 - (l) a surface water monitoring program designed to detect impacts from sediment runoff into waters;
 - (m) identification of remedial actions required to ensure compliance with the conditions of this environmental authority, and
 - (n) details of community consultation strategies and processes to be used in further developing and implementing the *GLNG Project Upstream Activities Erosion and Sediment Control Manual GLNG ESC Manual*.
- (B4) A copy of the *GLNG Project Upstream Activities Erosion and Sediment Control Manual GLNG ESC Manual* Santos must be submitted to any potentially affected landholders upon request by that landholder.

Works in watercourses, wetlands, lakes and springs

- (B5) Petroleum activity(ies) that require earthworks, vegetation clearing, placing fill and/or that will result in significant disturbance other than that associated with the construction and/or maintenance of **linear infrastructure**, is not permitted in or within:
- (a) 200 metres of any lake or spring; or
 - (b) 100 metres of the high bank of any other watercourse.
- (B6) All reasonable alternative locations must be considered prior to the construction of any linear infrastructure that will result in significant disturbance in or on the **bed and banks** of a watercourse or within the areas specified in condition (B5)(b).

- (B6a) Despite condition (B5), the infrastructure and associated activities necessary for construction and/or maintenance purposes specified in *Schedule B, Table 1 – Authorised Works in a Watercourse or within 200m of Springs* is permitted in the location specified in *Schedule B, Table 1 – Authorised Works in a Watercourse or within 200m of Springs*.

Schedule B, Table 1 – Authorised Works in a Watercourse or within 200m of Springs

Tenure	Description of Infrastructure/Works	Latitude	Longitude
PL232	Pipeline outfall location for ROP2 permeate	-25.732	149.136
PL232	Remedial works in tributary (Reach 1)	-25.732 to -25.729	149.135 to 149.138
PL232	Remedial works in tributary (Reach 2)	-25.729 to -25.726	149.138 to 149.140
PL232	Remedial works in tributary (Reach 3)	-25.726 to -25.726	149.140 to 149.141
PL232	Remedial works in tributary (Reach 4)	-25.726 to -25.718	149.141 to 149.142
PL232	Remedial works in tributary (Reach 5)	-25.718 to -25.715	149.142 to 149.143
PL232	Remedial works in tributary (Reach 6)	-25.715 to -25.710	149.143 to 149.145
PL232	Remedial works in tributary (Reach 7)	-25.710 to -25.708	149.145 to 149.145
PL232	Remedial works in tributary (Reach 8)	-25.708 to -25.705	149.145 to 149.146
PL232	Remedial works in wetland (Reach 9)	-	-
PL232	Remedial works in tributary (Reach 10)	-25.696 to -25.690	149.162 to 149.161
PL232	Hub 04 Compressor Station Batter Wall within 200m of a spring as depicted in the plan FV-HCS-04 Delineated Springs (1.4980ha disturbance)	-25.7271 to -25.7269	149.0849 to 149.0883

Note: Coordinates are decimal degrees as per Zone 56, GDA 94 datum

- (B7) The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the **bed and banks** of a watercourse or within the areas specified in (B5)(a) and (B5)(b) must be conducted in accordance with the following order of preference:
- (a) conducting works in times when there is no water present;
 - (b) conducting works in times of no flow;
 - (c) conducting works in times of flow but in a way that does not impede low flow.
- (B8) The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the **bed and banks** of a watercourse or within the areas specified in (B5)(b), or in any **general ecologically significant wetland** must not release from the site any contaminants to any waters that exceed the water quality limits specified in *Schedule B, Table 2 – Release Limits to Waters*.

Schedule B, Table 2 – Release Limits to Waters

Water Quality Parameters	Units	Water Quality Limits
Turbidity	NTU	10% above background water turbidity measured within 20 meters downstream of the construction and/or maintenance activity.
Hydrocarbons	-	No visible sheen

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- (B9) Background water turbidity must be measured within 20 metres upstream of the construction and/or maintenance activities.
- (B10) Monitoring is undertaken at a reasonable frequency to ensure compliance with condition (B8)0.
- (B11) Written notification detailing the location (GPS coordinates) of any significant disturbance to be undertaken in or on the **bed and banks** of a watercourse, or within the areas specified in condition (B5)(b), must be provided to the administering authority at least 10 business days prior to the commencement of the significant disturbance.
- (B12) Petroleum activities must occur outside a **wetland of high ecological significance**.
- (B13) Petroleum activities, other than linear infrastructure must occur outside a **general ecologically significant wetland**.
- (B14) Petroleum activities must not negatively impact a wetland of high ecological significance.
- (B15) Linear infrastructure activities, other than linear infrastructure construction and/or maintenance activities, must not change the existing surface water hydrological regime of any general ecologically significant wetland.
- (B16) The construction and/or maintenance of linear infrastructure in any general ecologically significant wetland must not:
- (a) prohibit the flow of surface water in or out of the wetland;
 - (b) impact surface water quality in the wetland unless specifically authorised by this environmental authority;
 - (c) drain the wetland;
 - (d) fill the wetland;
 - (e) impact bank stability; or
 - (f) result in the clearing of riparian vegetation outside of the required footprint.

Floodplains

- (B17) Where the petroleum activity(ies) is carried out on **floodplains** petroleum activity(ies) must be carried out in a way that does not:
- (a) concentrate flood flows in a way that will or may cause or threaten an adverse environmental impact; or
 - (b) divert flood flows from natural drainage paths and alter flow distribution; or
 - (c) increase the local duration of floods; or
 - (d) increase the risk of detaining flood flows; or
 - (e) pose an **unacceptable risk** to the safety of persons from flooding; or
 - (f) pose an **unacceptable risk** of damage to property from flooding.

Contaminant Release

- (B18) Subject to condition (B19), the release of contaminants to waters must only occur from the release points specified in Schedule B, Table 3 – Contaminant Release Points

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Schedule B, Table 3 – Contaminant Release Points

Description	Latitude (Decimal degrees GDA94)	Longitude (Decimal degrees GDA94)	Contaminant	Description of Receiving Waters
Reverse Osmosis Plant1 "Pony Hills Water Treatment Plant" (ROP1)	-25.76870484	149.030008341	Treated coal seam gas water	Tributary of Hutton Creek
Reverse Osmosis Plant 2 (ROP2)	-25.73	149.14	Treated coal seam gas water	Tributary of the Dawson River

- (B19) The release of contaminants to waters from ROP2 in accordance with condition (B18) must cease on or before 17 May 2024.
- (B20) The release of contaminants to waters from ROP2 in accordance with condition (B18) must not cause an adverse impact on the **species richness** or **species abundance** of aquatic fauna.
- (B21) The maximum volume of contaminants released to waters from ROP2 under condition (B18) must not exceed 18ML per day.
- (B22) The release of contaminants to waters from ROP2 must not occur until a baseline biological assessment has been undertaken to identify detectable aquatic flora and fauna of the receiving wetland.
- (B23) The baseline biological assessment required by condition (B22) must include:
- Spring (late dry season);
 - Autumn (recessional wet season);
 - for aquatic bird and frog communities – four events each consisting of three surveys; and
 - for aquatic flora, macro-invertebrate, fish and turtle communities – four events each consisting of one survey.
- (B24) Biological monitoring must be developed and undertaken to monitor, identify and describe any adverse impacts to aquatic fauna.
- (B25) The baseline biological assessment and biological monitoring required by conditions (B22) and (B24) must be certified by a suitably qualified person and must:
- be designed in accordance with all relevant methodologies detailed in ANZECC & ARMCANZ 2000 and the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland 2012*;
 - include multiple fixed receiving wetland monitoring sites and reference wetlands in accordance with ANZECC & ARMCANZ 2000;
 - include as a minimum surveys of aquatic flora, aquatic macro-invertebrate communities, fish communities, frog communities, turtle communities and water bird communities;
 - include monitoring of hydrology (e.g. flow, duration, periodicity, connectivity with groundwater systems); and
 - include monitoring of quality characteristics specified in *Schedule B, Table 2 Contaminant Limits*.

- (B26) The baseline biological assessment and biological monitoring required by (B22) and (B24) must include aquatic flora and fauna surveys that account for temporal variability and spatial variability in the aquatic habitat and be designed and implemented to detect adverse impacts to species richness and species abundance.
- (B27) A biological monitoring report must be prepared and certified by a suitably qualified person quarterly and submitted to the administering authority upon request. This report must include but not necessarily be limited to:
- (a) a summary of the previous monitoring results obtained from biological monitoring required by condition (B23) and a comparison of the previous monitoring results; and
 - (b) an evaluation / explanation of the data derived from the biological monitoring required by condition (B23) which determines whether an adverse impact on the species richness or species abundance numbers of aquatic fauna is being caused from the contaminant release to waters.
- (B28) Subject to condition (B22), measurable biological indicators and quantifiable threshold values to determine adverse impacts on aquatic fauna must be developed and submitted to the administering authority by 1 June 2014.

Receiving Environment Monitoring

- (B29) The release of contaminants to waters authorised by condition (B18) must be monitored at the locations and for each quality characteristic and at the frequency specified in *Schedule B, Table 4 – Contaminant Limits*.

Schedule B, Table 4 – Contaminant Limits

Quality Characteristic	Monitoring Point (MP)	Latitude (Decimal degrees GDA94)	Longitude (Decimal degrees GDA94)	Limit Type	Limit	Monitoring Frequency
Temperature	Wetland MP1	-25.708	149.146	Maximum	+/- 2°C above background. Background to be measured at Wetland MP4	Daily during release from ROP2
pH	Wetland MP1	-25.708	149.146	Range	6.5-8.5	
	Wetland MP1	-25.708	149.146	75th %ile	370 µS/cm	
Electrical Conductivity	ROP1 end of pipe	25.768704 84	149.030008 341	Maximum	500 µS/cm	Daily during release from ROP1
Turbidity	Wetland MP1	-25.708	149.146	Monitor only	Monitor only (NTU)	Daily during release from ROP2
	Dawson River MP1	-25.690	149.163			
Dissolved Oxygen (85-110% Saturation)	Wetland MP1	-25.708	149.146	Range	6.4-16.1 mg/L	
Total Suspended Solids	Wetland MP1	-25.708	149.146	50th%ile	50 mg/L	Weekly during release from ROP2
	Dawson River MP1	-25.690	149.163	Monitor only	Monitor only	
Total nitrogen	Wetland MP1	-25.708	149.146	Maximum	620 µg/L	
	Wetland MP2	-25.706	149.143			
	Wetland MP3	-25.707	149.149			
	Wetland MP4	-25.698	149.139			
	Wetland MP5	-25.701	149.153			
Ammonia	Wetland MP1	-25.71	149.145	Maximum	0.9 mg/L	
	Wetland MP2	-25.706	149.143	50%ile	Monitor only	
	Wetland MP3	-25.707	149.419			
Calcium	Inlet to Release Pipe (Dam)	25.730	149.090	Minimum	1 mg/L	
Chloride	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	175 mg/L	
Fluoride	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	1 mg/L	

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Quality Characteristic	Monitoring Point (MP)	Latitude (Decimal degrees GDA94)	Longitude (Decimal degrees GDA94)	Limit Type	Limit	Monitoring Frequency
Magnesium	Inlet to Release Pipe (Dam)	25.730	149.090	Monitor only	mg/L	Weekly during release from ROP2
Potassium	Inlet to Release Pipe (Dam)	25.730	149.090	Monitor only	mg/L	
Sodium	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	115 mg/L	
Sulphate	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	5 mg/L	
Aluminium	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	55 µg/L	
Arsenic (III)	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	24 µg/L	
Arsenic (IV)	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	13 µg/L	
Boron	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	1 mg/L	Weekly during release from ROP2
	Wetland MP2	-25.706	149.143			
	Wetland MP4	-25.698	149.139			
	Dawson River MP1	-25.690	149.163	Maximum	1 mg/L	Weekly during release from ROP1
	At the location where contaminants are being extracted for irrigation (applies to any current or future irrigation extraction)	-	-	Maximum when irrigation from the receiving waters is being undertaken	0.5 mg/L	Weekly during release from ROP2
Cadmium	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	0.2 µg/L	Weekly during release from ROP2
Chromium (VI)	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	1 µg/L	
Copper	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	1.4 µg/L	
Iron	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	300 µg/L	
Lead	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	3.4 µg/L	
Manganese	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	1,900 µg/L	
Mercury	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	0.6 µg/L	
Nickel	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	11 µg/L	
Selenium	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	11 µg/L	
Zinc	Inlet to Release Pipe (Dam)	25.730	149.090	Maximum	8 µg/L	
	Dawson River MP1	-25.690	149.163	Maximum	8 µg/L	Weekly during release from ROP1
Hardness (mg/L)	Inlet to Release Pipe (Dam)	25.730	149.090	Monitor only	Monitor only	Weekly during release from ROP2

Note: All metals and metalloids must be measured as total (unfiltered) and dissolved (filtered in the field).

- (B30) If the quality characteristic of Boron of the release exceeds the release limit of 0.5mg/L specified in Schedule B, Table 4 – Contaminant Limits, all third parties that undertake irrigation using water from the receiving waters must be notified.
- (B31) Releases to waters must be undertaken so as not to cause erosion of the bed and banks of the receiving waters, or cause a material build-up of sediment in such waters.

- (B32) Notwithstanding any other condition of this environmental authority, there must be no release of any toxic substance in any amount or concentration, either alone or in combination with substances already in the receiving water or release, that cause acute toxicological effects to aquatic organisms in the receiving environment.

Receiving Environment Monitoring Program

- (B33) A REMP must be developed to monitor, identify and describe any adverse impacts to surface water environmental values, quality and flows due to the authorised activity(ies) by 1 February 2014. The REMP must include periodic monitoring for the effects of the discharge on the receiving environment (under natural flow conditions) as a result of contaminant releases to waters from the site.
- (B34) For the purposes of the REMP, the receiving environment is the waters of the Dawson River and connected or surrounding waterways (including the receiving wetland) up to Yebna Crossing, located 8.5km downstream of the receiving wetland.
- (B35) The REMP must be maintained and certified by a suitably qualified person.
- (B36) The REMP must address but not be limited to the following:
- (a) description of potentially affected receiving waters including key communities and background water quality characteristics based on accurate and reliable monitoring data that takes into consideration any temporal and spatial variation (e.g. seasonality);
 - (b) 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) description of water quality objectives to be achieved;
 - (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;
 - (g) monitoring for algal blooms;
 - (h) monitoring of stream flow and hydrology;
 - (i) an assessment of bank stability, including monitoring for any potential adverse environmental impacts caused by the release including impacts to bank stability and erosion, and an evaluation of watercourse bank slumping;
 - (j) monitoring of physical chemical parameters as a minimum those specified in *Schedule B, Table 4 – Contaminant Limits*;
 - (k) monitoring biological indicators in accordance ANZECC & ARM CANZ 2000 (including Before, After, Control, Impact (BACI) Principal) and, where possible, consistent with methodologies specified by FRC Environmental Pty Ltd in their report titled *Santos Coal Seam Gas Fields Aquatic Ecology Impact Assessment*;
 - (l) monitoring 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;
 - (m) monitoring of a selection of invertebrate species (minimum of three from the local receiving environment) to assess ecosystem health (e.g. exoskeleton density) in respect to the availability of calcium and magnesium;
 - (n) the methods for analysis and interpretation all monitoring results;
 - (o) the locations of monitoring points (including the locations of proposed background and downstream impacted sites for each release point);
 - (p) the frequency or scheduling of sampling and analysis sufficient to determine water quality objectives and to derive site specific reference values within two (2) years (depending on wet season flows) in accordance with the *Queensland Water Quality Guidelines 2009*. For

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- ephemeral streams, this should include periods of flow irrespective of mine or other discharges;
- (q) monitoring of quality characteristics must include the limits specified in *Schedule B, Table 4 – Contaminant Limits* to assess the extent of the compliance of concentrations with water quality objectives derived through condition (B36)(p);
 - (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 control 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.

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SCHEDULE BB – GROUNDWATER

- (BB1) The extraction of groundwater as part of the petroleum activities from underground aquifers must not directly or indirectly cause environmental harm to any watercourse, lake, wetland or spring.

Seepage Monitoring Program

- (BB2) A Seepage Monitoring Program must be developed to detect any seepage to groundwater as a result of storing contaminants in a regulated structure(s) (e.g. surface dams, monocells).
- (BB3) The Seepage Monitoring Program, must include, but not necessarily be limited to:
- (a) procedures to detect any seepage to groundwater and surrounding soils from regulated structure(s) and its possible effect on groundwater and soils;
 - (b) identification of seepage monitoring bores and their locations including:
 - (i) baseline / hydraulically up-gradient seepage monitoring bores (i.e. bores where groundwater quality will not have been affected by petroleum activities;
 - (ii) seepage monitoring bores that are within aquifers potentially affected by the regulated structure(s) authorised under this environmental authority;
 - (iii) a geodetic survey of all seepage monitoring bores; a geodetic survey showing groundwater potentiometric surface;
 - (c) the Seepage Monitoring Program has been designed consistent with relevant Guidelines and Standards such that the Program design has:
 - (i) a sufficient number seepage monitoring points and / or wells to obtain representative groundwater samples from the uppermost aquifer up-gradient and down-gradient of the potential influence;
 - (ii) if a salt monocell is authorised under this environmental authority, a sufficient number of seepage monitoring bores located not more than 150 m from the monocell or the boundary of the monocell facility, whichever is the closer;
 - (iii) sufficient regularity and spatial and temporal replication to make statistically valid conclusions about the presence or absence of contaminants;
 - (iv) procedures to determine the quality of groundwater down gradient of any potential sources of contaminants including groundwater passing the relevant seepage monitoring bore(s);
 - (v) procedures to allow an assessment of whether there has been any statistically significant adverse change in groundwater quality at locations hydraulically down gradient of the containment activity(ies).
 - (d) procedures to determine groundwater flow direction, groundwater flow rate and hydraulic conductivity beneath the relevant regulated structure(s);
 - (e) sampling of all baseline or hydraulically up-gradient monitoring bores for the minimum groundwater parameters levels listed below quarterly over the 12 month period immediately prior to the commencement of any new containment activities:
 - (f) identification of the trigger parameter(s) associated with the potential contaminants of concern identified in (e);
 - (g) a sampling program of all seepage monitoring bores:
 - (i) to measure and record standing groundwater levels in metres accurate to 0.01 metres to be plotted as function of time (hydrograph) to identify seasonal patterns;
 - (ii) quarterly monitoring of seepage monitoring bores for the respective trigger parameter(s) identified in (f) whilst activities are being carried out;
 - (iii) annual monitoring of seepage monitoring bores for the respective trigger parameter(s) identified in (f) for a minimum of three (3) years after the containment activity(ies) ceases;
 - (h) a Seepage Trigger Action Response Procedure which must include but not be limited to the following:
 - (i) trigger levels for the relevant trigger parameter(s) identified in (f);

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- (ii) trigger and action response measures at which investigations will be undertaken;
 - (iii) action levels for the relevant possible contaminants of concern at which the holder of this environmental authority will undertake additional investigation into the potential for environmental harm, including the validation and verification of the source, cause and extent of contamination;
 - (i) identification monitoring equipment to be used; and
 - (j) a rationale containing details on the Programs purpose, conceptualisation and verification of the procedures, determinations, analysis and assumptions undertaken.
- (BB4) Seepage monitoring bores identified in (BB3) must be monitored quarterly for the trigger parameter(s) specified in Schedule BB – Table 1 (Seepage Monitoring Trigger Parameters).

Schedule BB, Table 1 – Seepage Monitoring Trigger Parameters

Parameter	Units	Untreated Coal Seam Water	Permeate	Brine
Static Water Level	m	monitor	monitor	monitor
pH	pH unit	monitor	monitor	monitor
EC	µS/cm	monitor	monitor	monitor
Major Anions (sulphate, chloride)	mg/L	monitor	-	-
Major Cations (calcium, magnesium, sodium and potassium)	mg/L	monitor	-	-

Monitoring Bores

- (BB5) The following information concerning each newly constructed seepage monitoring bore must be submitted to the administering authority with each annual return:
- (a) bore ID and location presented on a plan;
 - (b) design of the monitoring bores installed;
 - (c) specific construction information including but not limited to geographical coordinate (including the geophysical coordinate system utilised) depth of bore, depth and length of casing, depth and length of screening, presence of any measuring probe;
 - (d) identification of any aquifers intercepted by the monitoring bores;
 - (e) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible contaminants of concern; and
 - (f) a lithological log and preferably a stratigraphic interpretation to identify the important features.

SCHEDULE BE FLUID INJECTION

- (BE1) The injection of treated coal seam gas water, treated water or brine into a groundwater aquifer is not authorised unless stated under condition (BE2) of this environmental authority.

Injection of Brine from Pony Hills Water Treatment Plant into Timbury Hills Formation or CSG-depleted source formations

Target aquifers

- (BE2) The holder of this authority is permitted to inject brine or CSG water (injection fluid) into:
- (a) the Timbury Hills formation; or
 - (b) CSG-depleted source formations; provided the:
 - (i) injection zone formation is shown to be hydraulically isolated from water resource formations, as identified in Attachment 2: *Hydrogeology, 4 May 2008, Environmental Management Plan for the Fairview Project Area*, URS, through substantial and competent aquitards; and
 - (ii) the injection fluid shows inconsequential reactivity with the injection zone formation fluids and the formation itself.

Area of review

- (BE3) The holder of this authority must identify and review the location of all known wells, faults and other geologic features which could affect containment within 1,000m of the well, and that penetrate the injection zone formation. If the review identifies the potential for migration of formation or injection fluids out of the injection zone formation, mitigating action to prevent such migration must be taken before using the injection well. Details of the mitigation measures are to be recorded and provided to the Adminstrating Authority as part of the Well Completion Report.

Minimum construction requirements

- (BE4) All injection wells must be cased and cemented to prevent the movement of injection fluids into or between water resource aquifers. The casing and cement used in the construction of each newly drilled well shall be designed for the life expectancy of the well.
- (BE5) In determining and specifying casing and cementing requirements, at least the following must be considered:
- (a) identification of formations and water resource aquifers;
 - (b) depth to the bottom of the lowest occurring water resource aquifer;
 - (c) quality of formation fluids;
 - (d) depth to the injection zone;
 - (e) estimated maximum and average injection pressures;
 - (f) external pressure, internal pressure and axial loading;
 - (g) hole size;
 - (h) size and grade of casing strings;
 - (i) class of cement; and
 - (j) thermal regime.
- (BE6) The injection well must include the following:
- (a) surface casing fully cemented at least 20m into competent impermeable strata of:
 - (i) the uppermost occurring aquitard below the lowest occurring water resource aquifer; or
 - (ii) the aquitard overlying the CSG-depleted source formation;
 - (b) production casing fully cemented into the injection zone formation;
 - (c) an annulus packer located within 30m of the injection fluid release point;
 - (d) casing centralisers;
 - (e) inert fluid in the annulus;
 - (f) a fluid level detection system measuring the annulus fluid; and

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- (g) injection tubing extending through the packer to the injection zone.

Hydraulic isolation and well completion report

- (BE7) Upon completion of construction and development of an injection well, a Well Completion Report shall be submitted to the Administering Authority including logs and other tests conducted during the drilling and construction of the well. The report shall be prepared by an appropriately qualified practitioner and shall include:
- (a) information considered in the design of the well and casing design;
 - (b) details of the "as constructed" well including but not limited to: lithology, injection zone formation fracture pressure, injection zone formation pressure prior to injection, casing strings, and cement type and volumes;
 - (c) substantiated commentary on the potential for reaction between the formation fluid and injection fluid;
 - (d) a detailed interpretation of the logs against their specific objectives, for approval prior to commencement of injection operations;
 - (e) temperature survey and a casing integrity assessment technique such as:
 - (f) radioactive tracer survey; or
 - (g) oxygen activation log; or
 - (h) cement integrity log; or
 - (i) an equivalent survey technique approved by the Administering Authority; and
 - (j) a completed well schematic diagram.
- (BE8) In the event of converting an existing well to an injection well, as well as the above, a full length casing inspection log must be run.

Mechanical Integrity

- (BE9) The holder of this authority must demonstrate the internal and external mechanical integrity of the injection system. A well demonstrates mechanical integrity if:
- (a) there is no significant leakage in the casing, tubing, or packer; and
 - (b) there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.
- (BE10) Mechanical integrity must be demonstrated at the following times:
- (a) prior to commencement of injection;
 - (b) every five years after commencement of operation;
 - (c) following well refurbishment after a demonstration of loss of hydraulic isolation or if the injection tubing has been disturbed; and
 - (d) if the injection well is unused for a continuous period of twelve months, prior to recommencement of use.

Operating Requirements

- (BE11) The rate and volume of injection fluid must not cause wellhead pressures to exceed 90% of:
- (a) the formation fracture pressure; or
 - (b) the pressure at which the hydraulic isolation logging was carried out.
- (BE12) Injection must only occur through the injection tubing.
- (BE13) The injection fluid must be demonstrated to be aseptic.
- (BE14) The injection fluid must not contain more dissolved oxygen than the formation fluid or 200 parts per billion, whichever is the greater.

Existing injection wells

- (BE15) Wells currently in use as injection fluid disposal wells and not specifically authorised for that use must be either refurbished to meet the requirements of this Authority or plugged and abandoned in compliance with this Authority no later than three (3) years from the anniversary of issuance of this Authority.

Plugging and abandonment

- (BE16) Prior to abandoning an injection well, the well must be plugged with cement which will not allow the movement of injection fluids into or between water resource aquifers. The cement plug(s) shall be placed by methods such as:

- (a) the balance method; or
- (b) the dump bailer method; or
- (c) the two-plug method.

- (BE17) The well to be abandoned must be in a state of static equilibrium with the mud weight equalized top to bottom by circulating mud at least once prior to the placement of the cement plug(s).

Well closure plan

- (BE18) The holder of this authority must, within three (3) months from the date of this approval, develop and submit a well closure plan including the following:

- (a) the type and number of plugs to be used;
- (b) the placement of each plug including the elevation of the top and bottom of each plug;
- (c) the type, grade and quantity of material to be used in plugging;
- (d) the method of placement of the plugs;
- (e) any proposed test or measure to be made; and
- (f) the estimated cost of closure.

Note: These requirements are in addition to any other requirements that may exist under other Acts [for example, *Minimum standards for the construction and reconditioning of water bores that intersect the sediments of artesian basins in Queensland*, Natural Resources and Mines, 2004, Queensland Government].

Well Integrity

- (BE19) 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*. (i.e. Minimum Construction Requirements for Water Bores in Australia [National Water Commission, 2012 or subsequent revisions]).

- (BE20) Fluid injection 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, tubing, or packer; and
- (b) there is no significant fluid movement into a water resource aquifer through vertical channels adjacent to the well bore hole.

- (BE21) Wells used for untreated coal seam water or brine fluid injection must have:

- (a) an annulus packer at the junction of the aquitard and the target formation within the production casing;
- (b) injection tubing installed which extends through the packer into the target formation;
- (c) an inert fluid in the annulus between the injection tubing and the production casing; and
- (d) a system installed to record any loss of containment of the inert fluid.

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(BE22) For fluid injection:

- (a) where injection tubing is required by Condition (BE20), injection must only occur through injection tubing;
- (b) the injection pressure must not exceed the dry overburden pressure of the base of the overlying aquitard for injection at depth less than 100m or 90% of the formation fracture pressure for injection at depth greater than 100m.

Brine Injection monitoring and reporting

(BE23) The holder of this authority must:

- (a) monitor the nature of the injection fluid at sufficient frequency to yield data statistically representative of its characteristics. The sampling program shall have regard to changes in source of injection fluid, changes in flow rates from source aquifers and changes in any injection fluid treatment train;
- (b) continuously record injection pressure, flow rate, and cumulative volume of the injection fluid;
- (c) record the annulus pressure each hour;
- (d) measure the standing volume of annulus fluid each six months;
- (e) undertake pressure testing of packer, casing and cement each six months;
- (f) undertake an annual packer isolation test; and
- (g) in the event of an anomalous pressure or volume recording, to inform the administering authority within 24 hours of the occurrence.

Injection Management Plan

(BE24) An Injection Management Plan, prepared by a suitably qualified person, must be submitted to the administering authority prior to any proposed fluid injection activity(ies).

(BE25) The Injection Management Plan required by condition (BE24) must include but not necessarily be limited to:

- (a) estimated volumes and rates of fluid to be produced and injected;
- (b) a description of the physical, chemical and biological components and their concentrations of the fluid to be produced;
- (c) details of how and where the fluid will be produced, aggregated, stored and kept separate from waters until it is, treated and 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 demonstration that the injection fluid has inconsequential reactivity with the target formation and native groundwater it will come into contact with;
- (f) the characteristics of the receiving environment;
- (g) identification of the water quality impact zone and the hydraulic impact zone;
- (h) identification of 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 proposed fluid injection wells;
- (j) 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 Act 1994*, *Environmental Protection Regulation 2008*, *Environmental Protection (Water) Policy 1997* and the *Queensland Water Quality Guidelines 2006*;
- (k) an assessment of the potential impacts on the environmental values of the receiving environment including 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;
- (l) a risk assessment consistent with the risk framework specified in Australian Guidelines for Water Recycling: Managed Aquifer Recharge identifying potential hazards, their inherent risk, preventative measures for the management of potential hazards and after consideration of the operational monitoring to manage potential hazards identified in the

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- risk assessment including details on sampling and analysis methods including frequency and locations, and quality assurance and control;
- (m) verification methods to assess performance of the injection activities;
 - (n) 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;
 - (o) the indicators or other criteria against which the performance of fluid injection will be assessed;
 - (p) procedures that will be adopted to regularly review the monitoring program and to report 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;
 - (r) procedures for dealing with accidents, spills, failure of containment structures, and other incidents that may arise in the course of fluid injection; and
 - (s) a program to monitor impacts on the environmental values of the receiving environment identified by Condition (BE25)(k).

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SCHEDULE C – REGULATED STRUCTURES

Assessment of Hazard Category

- (C1) The **hazard category** of any **structure** must be assessed by a suitably qualified and experienced person in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* as amended from time to time.
- (C2) The **hazard assessment** required under condition (C1) 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 hazard structure, at least biennially after its construction;
 - (d) for an **existing low hazard dam**, by 21 November 2011.
- (C3) A hazard assessment report and **certification** must be prepared by a **suitably qualified and experienced person** for any **structure** assessed

Note: The hazard assessment report may include a hazard assessment for more than one structure.

- (C4) Where an existing structure is for the first time assessed as significant or high, the structure must meet the conditions required for regulated structures under this environmental authority within 12 months of that assessment.

Construction of Low Hazard Dam to Contain Wetting Front

- (C5) Where a dam is assessed as low hazard, 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.
- (C6) In the event of early signs of loss of structural or hydraulic integrity of a low hazard dam:
- (a) immediate action to prevent or minimise any actual or potential environmental harm must be taken;
 - (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 Hazard Dams

- (C7) The condition of all low hazard 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 hazard assessment based on the particular circumstances of each dam.

Design and Construction of a Regulated Structure

- (C8) **Construction** of any dam determined to be a **regulated structure** is prohibited until:
- (a) a **hazard category** assessment report and certification has been submitted to the administering authority;
 - (b) a **design plan** for the regulated structure has been prepared by a **suitably qualified and experienced person**; and

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- (c) certification from a suitably qualified and experienced person for the design and design plan and the associated operating procedures in compliance with the relevant conditions of this environmental authority has been received.
- (C9) The design plan must contain the information prescribed in the *Guideline – Structures which are dams or levees constructed as part of environmentally relevant activities*.
- (C10) 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 Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- (C11) All regulated structures must be constructed in accordance with a design plan that has been certified by a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- (C12) Certification by a 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.
- (C13) All **regulated structures** must be designed and constructed to prevent:
 - (a) floodwaters from entering the regulated structures from a watercourse or drainage line to the annual exceedance probability specified for determining spillway capacity in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, 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 in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, 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 Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

Operation of a Regulated Structure

- (C14) 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.

Regulated Dam Register

- (C15) A register of regulated dams must be established in accordance with the administering authority's *Regulated Dam Register* template, as amended from time to time.
- (C16) The information contained in the register of regulated dams must always be current and complete on any given day.

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Mandatory Reporting Level

- (C17) The Mandatory Reporting Level must be marked on each regulated structure in such a way that it is clearly observable during routine inspections of each dam.
- (C18) 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.

Design Storage Allowance

- (C19) On 1 November of each year, storage must be available in each regulated structure to meet the design storage allowance for the dam in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.
- (C20) On becoming aware that the regulated structure 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.

Monitoring

- (C21) The condition of all containment structures 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 hazard assessment based on the particular circumstances of each dam.
- (C22) Each regulated structure must be monitored for the water quality characteristics and at the monitoring location and frequency specified in *Schedule C – Table 1 Regulated Structure Contaminant Monitoring* as follows:

Schedule C – Table 1 Regulated Structure Contaminant Monitoring

Quality Characteristic	Monitoring Location	Frequency of Monitoring
pH (pH unit)	At least three (3) different structure profile depths for each sampling event and be taken as far as practicable from the edge of the regulated structure	During the month of October every year
Electrical Conductivity (µS/m)		
Turbidity (NTU)		
Temperature		
Dissolved Oxygen (mg/L)		
Sodium adsorption ratio (SAR)		
Aluminium (µg/L)		
Arsenic (µg/L)		
Barium (µg/L)		
Boron (µg/L)		
Cadmium (µg/L)		
Chromium (CrVI) (µg/L)		
Copper (µg/L)		
Iron (µg/L)		
Fluoride (µg/L)		
Lead (µg/L)		
Manganese (µg/L)		
Mercury (µg/L)		
Nickel (µg/L)		
Selenium (µg/L)		
Silver (µg/L)		
Strontium (µg/L)		
Tin (µg/L)		
Zinc (µg/L)		
Total phosphorus (mg/L)		
Total Nitrogen (mg/L)		
Total petroleum hydrocarbons (µg/L)		

Release

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Quality Characteristic	Monitoring Location	Frequency of Monitoring
BTEX ($\mu\text{g/L}$)		
Polycyclic aromatic hydrocarbons ($\mu\text{g/L}$)		
Gross alpha + gross beta or radionuclides by gamma spectroscopy (Bq/L)		

Annual Inspection and Report

(C23) Each regulated structure must:

- (a) be inspected annually by a suitably qualified and experienced person.
- (b) Be assessed for the condition and adequacy for dam safety and against the necessary structural, geotechnical and hydraulic performance against the criteria in each annual inspection.

(C24) A **suitably qualified and experienced person** must:

- (a) prepare an annual inspection report containing details of assessment and including recommended actions to ensure the integrity of the structure;
- (b) certify the annual inspection report in accordance with the *Manual for Assessing Categories and Hydraulic Performance of Dams*, as amended from time to time.

(C25) The recommendations contained within the annual inspection report must be considered and action(s) taken to ensure that the regulated structure will safely perform its intended function.

(C26) Within 20 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.

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Release

SCHEDULE D — LAND

General

- (D1) Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.
- (D2) The release of contaminants to land 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.

Chemical Storage

- (D3) All chemical storages must:
- (a) be stored in, or serviced by, an effective containment system that is impervious to the materials stored therein; and
 - (b) be stored and handled in accordance with the relevant Australian Standard where such Standard is available; and
 - (c) be managed to prevent the release of substances to waters or land.

Hydrostatic Test Water and Low Point Drains

- (D4) Contaminants that are hydrostatic test water from pipelines and contaminants from low point drains may be released to land in accordance with condition (D2).

Use of Coal Seam Gas Water

- (D5) Coal seam gas water produced from the authorised petroleum activity(ies) which is used for:
- (a) domestic or stock 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 purposes, as amended from time to time.
- (D6) Coal seam gas water produced from the authorised petroleum activity(ies) may be used for:
- (a) dust suppression on roads; and
 - (b) for construction and operational purposes for the petroleum activity(ies) authorised by this environmental authority.

Sewage Treatment Works

- (D7) Treated sewage effluent may only:
- (a) be released to land by sub-surface or spray irrigation at designated, fenced contaminant release area(s)
 - (b) be used for dust suppression, construction and operational purposes in accordance with conditions (D18) and (D20).

Conditions (D8) to (D11) apply to temporary and permanent sewage treatment plant operations

- (D8) Treated sewage effluent may only be released to land by large droplet or by subsurface irrigation at designated, fenced and signed contaminant release areas.

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- (D9) A buffer distance of 50 meters must be applied from the location of the effluent irrigation area to any watercourse, wetland or protected area and 100m from any potable water supply (bore or a catchment) or stock drinking water supply.
- (D10) When circumstances prevent the irrigation of treated sewage effluent to land, the contaminants must be directed to on-site storage or lawfully disposed of off-site.
- (D11) The quantity of treated sewage effluent used in accordance with condition (D7) must be determined by an appropriate method, for example, a flow meter.

Conditions (D12) to (D13) apply to temporary and permanent sewage treatment plant operations with a design capacity of greater than 21 to 100 equivalent persons

- (D12) Treated sewage effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule D, Table 1 – Treated Sewage Effluent Standards for Release to Land*.
- (D13) Treated sewage effluent released to land must be monitored at the frequency and for each quality characteristic specified in *Schedule D, Table 1 – Treated Sewage Effluent Standards for Release to Land*.

Schedule D, Table 1 – Treated Sewage Effluent Standards for Release to Land

Quality Characteristic	Sampling and <i>in situ</i> measurement point location	Limit Type	Release Limit	Frequency
5-day Biochemical oxygen demand (BOD)	Release pipe from sewage treatment works	Maximum	20 mg/L	Quarterly
E. coli		80 th percentile based on at least 5 samples with not less than 30 minutes between samples	1000 cfu per 100 mL	
		Maximum	10000 cfu per 100 mL	
pH		Range	6.0-8.5	Monthly
Dissolved Oxygen		Minimum	2mg/L	
Electrical Conductivity		Monitor only	-	

Conditions (D14) through (D17) apply only to permanent sewage treatment plant operations with a design capacity of greater than 100 to 450 equivalent persons

- (D14) Prior to construction of a sewage treatment facility, the minimum area of land and location to be utilised for irrigation of treated sewage effluent, excluding any necessary buffer zones, must be nominated.
- (D15) All nominated locations and minimum areas of land in condition (D14) must be determined using the Model for Effluent Disposal using Land Irrigation (MEDLI) program or recognised equivalent.
- (D16) A copy of results of the determinations required in condition (D15) must be submitted to the administering authority.
- (D17) If, within 20 business days following the submission of the results required by condition (D16) the administering authority provides comments on the submission, the holder of this environmental authority must:

- (a) have due regard to that comment in the finalisation of the amended results; and
- (b) submit the finalised amended results within 40 business days after the administering authority provided comments; and
- (c) implement the amended results.

Conditions (D18) through (D20) apply only to treated sewage effluent use for the purposes of dust suppression, construction and operational purposes.

- (D18) Treated sewage effluent produced from the authorised petroleum activity(ies) may only be used for dust suppression, construction and operational purposes provided that:
- (a) the treated sewage effluent has not been stored in a dam or tank prior to use and;
 - (b) the treated sewage effluent quality meets the release limits specified in *Schedule D, Table 2 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes* for each of the water quality characteristics; and
 - (c) on local government controlled roads, written approval from the relevant Local Government has been given to the holder of this environmental authority.
- (D19) Treated sewage effluent must comply, at the sampling and in-situ measurement point(s), with each of the release limits specified in *Schedule D, Table 2 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes* for each quality characteristic.
- (D20) Treated sewage effluent released to land must be monitored at the frequency and for each quality characteristics specified in *Schedule D, Table 2 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes*.

Schedule D, Table 2 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes

Quality Characteristic	Sampling and in-situ measurement point location	Limit type	Release Limit	Frequency
pH	e.g. treated sewage effluent storage	Range	6.0 to 8.5	Weekly ¹
5 – day Biochemical Oxygen Demand (BOD)		Median	20 mg/L	
E.Coli		Median	<10 cfu per 100 mL	
Electrical Conductivity		Maximum	1600 uS/cm	
Turbidity		95%ile (max)	2 (5) NTU	
Total Suspended Solids		Median	5 mg/L	

¹ Monitoring is to be conducted on a weekly basis until 12 months of monitoring demonstrates no exceedances of the release limits. Monthly monitoring can occur thereafter, excluding E.Coli.

SCHEDULE E – DISTURBANCE TO LAND

Soil Management Plan

- (E1) The identification and management of soil must be undertaken in accordance with the Soils Management Plan as amended from time to time.
- (E2) A copy of the Soil Management Plan must be made available to any potentially affected landholder upon request by that landholder.

Fauna Management

- (E3) Measures must be employed to prevent fauna entrapment:
 - (a) during the construction of pipelines in pipe sections and pipeline trenches; or
 - (b) during the construction and operation of well infrastructure and dams.

Confirming environmentally sensitive areas, wetlands and springs

- (E4) Prior to undertaking petroleum activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground environmentally sensitive areas, wetlands and springs at that location must be undertaken by a suitably qualified person.
- (E5) A suitably qualified person must develop and certify a methodology so that condition (E4) can be complied with and which is appropriate to confirm on-the-ground environmentally sensitive areas, wetlands and springs by 18 August 2014.
- (E6) Where areas mapped as environmentally sensitive areas, wetlands and springs differ from those confirmed under conditions (E4) and (E5), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground values.
- (E7) All documentation survey information, photographs, field data or any material associated with the field validation requirements in (E4) must be maintained for the life of the environmental authority to demonstrate to the administering authority that surveys were conducted in a manner consistent with requirements contained in (E5).

Planning for land disturbance

- (E8) The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles:
 - (a) maximise the use of areas of pre-existing disturbance;
 - (b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative; impacts, on areas of native vegetation or other areas of ecological value;
 - (c) minimise disturbance to land that may otherwise result in **land degradation**;
 - (d) minimise isolation, fragmentation or dissection of tracts of native vegetation; and
 - (e) minimise clearing of native mature trees.

Disturbance to Land – Environmentally Sensitive Areas

- (E9) Petroleum activities must be carried out in accordance with *Schedule E, Table 1 – Petroleum Activities in Environmentally Sensitive Areas*, *Schedule E, Table 2 – Authorised Disturbance* and any other relevant conditions of this environmental authority.

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Schedule E, Table 1 – Petroleum Activities in Environmentally Sensitive Areas

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Category A ESAs	No petroleum activities permitted	Only low impact petroleum activities permitted.	Only limited petroleum activities permitted
Category B ESAs excluding 'Endangered' Regional Ecosystems	Only low impact petroleum activities permitted	Only limited petroleum activities permitted Subject to condition (E11)	N/A
Category C ESAs that are Nature Refuges, Koala Habitat and/or Declared Catchment Areas	Only low impact petroleum activities permitted	Only limited petroleum activities permitted Subject to condition (E11)	N/A
Category B ESAs that are 'Endangered' Regional Ecosystems	Only limited petroleum activities permitted Subject to condition (E10)	Only limited petroleum activities permitted Subject to condition (E11)	N/A
Category C ESAs that are Essential Habitat, Essential Regrowth Habitat and/or 'Of Concern' Regional Ecosystems	Only limited petroleum activities permitted Subject to condition (E10)	Only limited petroleum activities permitted Subject to condition (E11)	N/A
Category C ESAs that are Resource Reserves	Only limited petroleum activities permitted Subject to condition (E10)	Only limited petroleum activities permitted Subject to condition (E11)	N/A
Category C ESAs that are State Forests and/or Timber Reserves	Limited petroleum activities permitted subject to condition (E10) Petroleum activities that are extraction activities and screening activities permitted.	N/A	N/A

Note: Approvals may be required under the *Forestry Act 1959* where the petroleum activity(ies) is proposed to be carried out in ESAs that are State Forests or Timber Reserves.

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Schedule E, Table 2 – Authorised Disturbances

Authorised Activity	Authorised Activity Section	Location of Development (GDA94)		Size of Development		ESA
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
Dawson's Bend Road Widening and Co-located Power lines	Section 1	-25.720723 to -25.719763	149.050898 to 149.048122	Length within PPZ of Category C ESA 283 m	Area within PPZ of Category C ESA 1.11 ha	PPZ of Category C ESA (Of Concern RE 11.10.7/ 11.10.9/11.3.25)
	Section 2	-25.71906 to -25.721033	149.040465 to 149.036057	Length within Category C ESA 70 m Length within PPZ of Category C ESA 414 m	Area within Category C ESA 0.23 ha Area within PPZ of Category C ESA 1.53 ha	Category C ESA (Of Concern RE 11.10.7/ 11.10.9/11.3.25)
	Section 3	-25.737755 to -25.742661	149.009531 to 148.998035	Length within PPZ of Category C ESA 1325 m	Area within PPZ of Category C ESA 3.82 ha	PPZ of Category C ESA (Of Concern RE 11.3.2/ 11.3.25)
	Section 4	-25.751823 to -25.75041	148.983035 to 148.947449	Length within Category C ESA 2580 m Length within PPZ of Category C ESA 1280 m	Area within Category C ESA 7.26 ha Area within PPZ of Category C ESA 3.62 ha	Category C ESA (State Forest/ Timber Reserve which is predominantly RE 11.10.9)
	Section 5	-25.727628 to -25.727588	149.075484 to 149.073348	Length within PPZ of Category C ESA 216 m	Area within PPZ of Category C ESA 0.58 ha	PPZ of Category C ESA (Of Concern RE 11.10.8)
Total for sections within ESA and PPZ				6168 m	18.15 ha	
Water to Grade Flowlines	FV36 (FV06-37)	-25.648185 to -25.649338	148.930447 to 148.92969	Length within PPZ of Category C ESA 354 m	Area within PPZ of Category C ESA 0.38 ha	Category C ESA (Essential Habitat within RE 11.10.1/ 11.10.13a and RE 11.9.4a)
	FV103 (FV06-38)	-25.644467 to -25.650721	148.936713 to 148.9391135	Length within PPZ of Category C ESA 735 m	Area within PPZ of Category C ESA 0.89 ha	Category C ESA (Essential Habitat within RE 11.10.1/ 11.10.13a and RE 11.9.4a)
	FV34 (FV06-32) and Connecting Flowlines	-25.641787 to -25.642241	148.943019 to 148.938051	Length within Category C ESA 685 m	Area within Category C ESA 0.83 ha	Category C ESA (Essential Habitat within RE 11.10.1/ 11.10.13a)
		-25.641787 to -25.641818	148.943019 to 148.945227			
		-25.642471 to -25.642241	148.930648 to 148.938051	Length within PPZ of Category C ESA 952 m	Area within PPZ of Category C ESA 1.4 ha	
		-25.642471 to -25.64314	148.930648 to 148.933636			

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Authorised Activity	Authorised Activity Section	Location of Development (GDA94)		Size of Development		ESA
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
		-25.642241 to -25.64342	148.938051 to 148.936485			
		-25.641787 to -25.641818	148.943019 to 148.945227			
	FV10-03 (FV-WP-49)	-25.678885 to -25.680651	148.895576 to 148.900354	Length within PPZ of Category C ESA 659 m	Area within PPZ of Category C ESA 1.3 ha	Category C ESA (Essential Habitat within RE 11.10.1/ 11.10.13a)
Total for sections within ESA and PPZ				3385 m	4.8 ha	
Brine Dams	Brine Dam A+B (as per 6399 – Fairview F-HCS-04 Remote Brine Pond A and B Constraints Mapping, dated 23 May 2012)	-25.751025 -25.751261 -25.751242 -25.751220 -25.751156 -25.751110 -25.750970 -25.750952 -25.750853 -25.750194 -25.749429 -25.749322 -25.749188 -25.749091 -25.749088 -25.748916 -25.748500 -25.748468 -25.747809 -25.747611 -25.747516 -25.747253 -25.747835 -25.748766 -25.749702 -25.750627 -25.750863	149.073924 149.072946 149.072660 149.072508 149.072194 149.072048 149.071686 149.071650 149.071470 149.070739 149.070477 149.070469 149.070463 149.070475 149.070484 149.070189 149.069686 149.069628 149.068897 149.068825 149.068957 149.070644 149.070963 149.071797 149.071624 149.072405 149.073808		Area within PPZ of Category C ESA 6.72 ha	PPZ Category C ESA (Of Concern RE) (11.10.8)
	Brine Dam C+D (as per 6399 – Fairview F-HCS-04 Remote Brine Pond C and D Constraints Mapping, dated 23 May 2012)	-25.741196 -25.743597 -25.743510 -25.743221 -25.742409 -25.742232 -25.741825 -25.741343 -25.741210 -25.741173 -25.740292 -25.739765 -25.739636 -25.740474 -25.740806 -25.740891 -25.744807 -25.745344 -25.745153 -25.745059 -25.745042 -25.744835	149.073263 149.071490 149.071493 149.071507 149.071772 149.071901 149.072205 149.072807 149.073125 149.073226 149.073412 149.073637 149.073745 149.073879 149.074079 149.073333 149.070273 149.069394 149.069606 149.069814 149.069853 149.070173		Area within PPZ of Category C ESA 1.71 ha	PPZ Category C ESA (Of Concern RE) (11.10.8)

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MH

Authorised Activity	Authorised Activity Section	Location of Development (GDA94)		Size of Development		ESA
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
	Flowline	-25.73526 to -25.746804	149.080295 to 149.068909	Length within PPZ of Category C ESA 2069 m	Area within PPZ of Category C ESA 4.14 ha	PPZ Category C ESA (Of Concern RE) (11.10.8)
Total for sections within ESA and PPZ				2069 m	12.56 ha	
PL232						
Pipeline Route (gas and water gathering lines)	FV530/531/532 (FV07-10) and connecting flowlines					
	0	-25.65680	149.04005			
	1	-25.65713	149.04038			
	2	-25.65714	149.04070			
	3	-25.65790	149.04230			
	4	-25.65826	149.04280			
	5	-25.65997	149.04311			
	6	-25.66007	149.04279			
	7	-25.66031	149.04262			
	8	-25.66068	149.04250			
	9	-25.66163	149.04183			
	10	-25.66179	149.04117			
	11	-25.66242	149.04013			
	12	-25.66330	149.04008			
	13	-25.66332	149.04061			
	14	-25.66371	149.04126			
	15	-25.66401	149.04106			
	16	-25.66391	149.04086			
	17	-25.66475	149.03999			
	18	-25.66483	149.04021			
	19	-25.66515	149.04080			
	20	-25.66524	149.04127			
	21	-25.66545	149.04192			
	22	-25.66576	149.04254			
	23	-25.66613	149.04278			
	24	-25.66721	149.04383			
	25	-25.66738	149.04385			
	26	-25.66778	149.04434			
	27	-25.66837	149.04426			
	28	-25.66903	149.04445			
	29	-25.66963	149.04482			
	30	-25.67003	149.04508			
	31	-25.67181	149.04529			
	32	-25.67328	149.04556			
	33	-25.67380	149.04536			
	34	-25.67399	149.04548			
	35	-25.67451	149.04725			
	36	-25.67489	149.04770			
	37	-25.67556	149.04918			
	38	-25.67666	149.05016			
	39	-25.67012	149.04373			
	40	-25.67015	149.04334			
	41	-25.67031	149.04265			
	42	-25.67005	149.04223			
	43	-25.67001	149.04171			
	44	-25.67002	149.04086			
	45	-25.66992	149.04049			
	46	-25.67025	149.03818			
	47	-25.67099	149.03503			
	48	-25.67150	149.03343			
	49	-25.67192	149.03286			
				3755	8.146	<p>In accordance with Appendix 3 – Well Pad FV530/531/532 (FV07-10) and connecting flowlines</p> <p>Category A ESA Primary Protection Zone</p> <p>Category A ESA Secondary Protection Zone</p> <p>Category B ESA</p> <p>Category B ESA Primary Protection Zone</p> <p>Category C ESA (State Forest, Timber Reserve or Of Concern RE)</p> <p>Category C ESA (Essential Habitat)</p> <p>Category C ESA Primary Protection Zone (State Forest, Timber Reserve or Of Concern RE)</p> <p>Category C ESA Primary Protection Zone (Essential Habitat)</p> <p>Category C ESA Secondary Protection Zone (Essential Habitat)</p>

Release

CHH

Authorised Activity	Authorised Activity Section	Location of Development (GDA94)		Size of Development		ESA
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
Access Track Upgrade	Way Point (WP) 27 to WP 38	-25.671168 -25.582716	149.139478 149.074461	14500	0.0087	Category A ESA and PPZ (RE 11.10.1)
CDJV Temporary Workers Camp and Office	Point 1 to Point 33 as depicted in the plan titled F-HCS-04 CDJV Camp	-25.738082 to -25.736834	149.079144 to 149.079201	N/A	2.44ha	Primary Protection Zone of a Category C ESA (Of Concern Regional Ecosystem)
FKG Temporary Workers Camp	Point 1 to Point 14 as depicted in the plan titled F-HCS-04-FKG Camp	-25.714544 to -25.714518	149.042233 to 149.042306	N/A	3.19ha	Primary Protection Zone of a Category C ESA (Of Concern Regional Ecosystem)
Tenix Temporary Workers Camp	Point 1 to Point 45 as depicted in the plan titled F-HCS-04 Tenix Camp	-25.718279 to -25.714581	149.048019 to 149.048076	N/A	2.71	Primary Protection Zone of a Category C ESA (Of Concern Regional Ecosystem)
Pony Hills Long Distance Water Line	Flowline	-25.762684 to -25.765751	149.044457 to 149.043946	334	0.5	Category C ESA (State Forest)

(E10) Prior to carrying out limited petroleum activities undertaken within environmentally sensitive areas in accordance with Schedule E, Table 1 – Petroleum Activities in *Environmentally Sensitive Areas*, it must be demonstrated, in the following order of preference that:

1. no reasonable or practicable alternative exists for carrying out the limited petroleum activities within the **environmentally sensitive area**;
2. the **limited petroleum activities** are preferentially located in pre-existing areas of clearing or significant disturbance;
3. clearing widths for linear Infrastructure is minimised to maximum extent possible, taking into account the following matters:
 - (a) safe vehicle movement;
 - (b) drainage devices installed are of a type that is appropriate for the track type and location;
 - (c) erosion and sediment control measures installed are in accordance with the Erosion and Sediment Control Plan required by Conditions (B2) and (B3); and
 - (d) power line stays have been preferentially located within the pipeline right of way where possible.
4. the clearing widths specified in *Schedule E, Table 3 – Authorised Disturbances for Linear Infrastructure* are not exceeded.

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Schedule E, Table 3 – Authorised Disturbance for Linear Infrastructure

Type of Linear Infrastructure	Maximum Clearing Width (m)
(A) Access track(s) not associated with a pipeline(s) or overhead power line(s):	
(a) single carriage access tracks	18
(b) dual carriage access tracks	21
(c) additional clearing for take-off drains associated with (A)(a) or (b)	10
(B) Pipeline(s) including provision for a utility corridor and access track, including:	
(a) single pipeline trench containing one gas or water pipeline and/or one parallel gas or water pipeline	25
(b) additional clearing for any additional parallel trench for a gas or water pipeline	13
(c) total clearance for a pipeline with turnaround bays and other associated work areas	50
(C) Co-located tracks, pipelines and power lines:	
(a) single carriage access tracks with a single pipeline trench	24
(b) single carriage access tracks with overhead power lines only, or single carriage access tracks with overhead power lines and a single pipeline trench	29
(c) dual carriage access tracks with a single pipeline trench	27
(d) dual carriage access tracks with overhead power lines only, or dual carriage access tracks with overhead power lines and a single pipeline trench	32
(e) additional clearing for take-off drains associated with (C)(a), (b) or (c)	10
(D) Power lines:	
(a) overhead power lines not associated with access tracks or pipelines	23
(b) additional clearing for power line stays associated with (C)(a), (b), (c), (d), or (D)(a)	10

- (E11) If limited petroleum activity(ies) are located within a primary protection zone or secondary protection zone of an environmentally sensitive area, that the activity(ies) must not negatively affect the adjacent environmentally sensitive area.

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SCHEDULE F – ENVIRONMENTAL NUISANCE

Odour, dust and other airborne contaminants

- (F1) The release of odour, dust or any other airborne contaminant(s), or light from the petroleum activities must not cause an environmental nuisance at any sensitive place.

Nuisance Monitoring

- (F2) When the administering authority advises of a complaint alleging nuisance, the complaint must be investigated as soon as practicable. The investigation is to include monitoring of environmental nuisance at any sensitive place within a reasonable and practical timeframe as specified by the administering authority.
- (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 (5) business days of completing the complaint investigation, unless a longer time is agreed to 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) do not result in further environmental nuisance.
- (F5) Noise monitoring and recording under this environmental authority must include, but not necessarily be limited to:
- (a) $L_{AN,T}$ (where N equals the statistical levels of 1, 10 and 90 and $T=15$);
 - (b) $L_{Aeq\ adj, 15\ mins}$;
 - (c) background noise level as $L_{A\ 90, 15\ mins}$;
 - (d) $Max\ L_{pA, 15\ mins}$;
 - (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, $Max\ L_{pZ, 15\ min}$; 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.

Noise

- (F6) Noise planning must be undertaken in accordance with the *Noise Management Plan – Fairview Project Area, Roma Shallow Gas Project Area, Arcadia Valley Project Area* dated 29 June 2011 or any subsequent version.
- (F7) Any subsequent revision of the *Noise Management Plan – Fairview Project Area, Roma Shallow Gas Project Area, Arcadia Valley Project Area*, must include, but not necessarily be limited to:
- (a) 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;

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- (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 are likely to exceed the noise limits in *Schedule F, Table 1 – Noise Limits at Sensitive Receptors*;
 - (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, and where there are no alternative arrangements in place, any potential noise emissions from the relevant petroleum activity(ies) must be modelled or 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 activities 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 – 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	$L_{Aeq,adj,15\ min}$	45dBA	43dBA	40dBA
6:00 pm – 10:00 pm	$L_{Aeq,adj,15\ min}$	40dBA	38dBA	35dBA
10:00 pm – 6:00 am	$L_{Aeq,adj,15\ min}$	28dBA	28dBA	28dBA
	Max $L_{pA, 15\ mins}$	55dBA	55dBA	55dBA
6:00 am – 7:00 am	$L_{Aeq,adj,15\ min}$	40dBA	38dBA	35dBA

Note – The noise limits in Table 1 have been set based on the following deemed background noise levels (L_{ABG}):

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 $L_{Aeq, adj, 15\ min}$.

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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 audible	+ 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:
- (a) 60 dB(C) measured outside the sensitive receptor; and
 - (b) the difference between external A-weighted and C-weighted noise levels is no greater than 20 dB; or
 - (c) 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.

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SCHEDULE G – AIR

Fuel Burning or Combustion Equipment

- (G1) Fuel burning or combustion equipment must:
- (a) not be operated unless it is listed in *Schedule G, Table 1 – Authorised releases of contaminants to air from point sources*;
 - (b) not exceed the release limits specified in *Schedule G, Table 1 – Authorised releases of contaminants to air from point sources*;
 - (c) be monitored for the release limits at the release point locations and at the monitoring frequency specified in *Schedule G, Table 1 – Authorised releases of contaminants to air from point sources*.

Schedule G, Table 1 – Authorised releases of contaminants to air from point sources

Resource Authority	Facility	Release Point Locations	Release Limits			Monitoring Frequency
			Minimum Release Height (m)	Minimum Efflux Velocity (m/sec)	NOx as Nitrogen Dioxide Maximum mass emission rate (g/s)	
PL91	CS1	Compressor 2 (K048)	5.5	24	2	At least one release point must be monitored per year on a rotational basis.
		Compressor 3 (K049)	6.0	33	2	
		Compressor 4 (K044)	6.0	23	2	
		Compressor 6 (K046)	8.0	23	2	
PL92	CS2	Compressor A (K057)	6.0	23	2	At least one release point must be monitored per year on a rotational basis.
		Compressor B (K058)	6.0	23	2	
		Compressor C (K059)	6.0	23	2	
		Compressor D (K055)	8.1	17	2	
		Compressor E (K056)	8.1	17	2	
		Compressor F (K050)	10.0	17	10	At least one release point must be monitored per year on a rotational basis.
		Compressor G (K051)	10.0	17	10	
		Compressor H (K052)	10.0	17	10	
		Compressor J (K053)	10.0	17	10	
PL92	CS3	Compressor 1 (K063)	8.3	17	2	At least one release point must be monitored per year on a rotational basis, with all release points monitored at least once in a 6 year period
		Compressor 2 (K064)	8.3	17	2	
		Compressor 3 (K065)	8.3	17	2	
		Compressor 4 (K066)	8.3	17	2	

		Compressor 5 (K067)	8.3	17	2	
		Compressor 6 (K068)	8.3	17	2	
		Compressor 7 (K069)	8.3	17	2	
		Compressor 8 (K070)	8.3	17	2	
PL232	F-HSC-04	Hub GTC1	15.0	18	2	All release points must be monitored during commissioning of the facility. Thereafter, at least one release point must be monitored per year on a rotational basis, with all release points monitored at least once in a 6 year period.
		Hub GTC2	15.0	18	2	
		Hub GTC3	15.0	18	2	
		Hub GTC4	15.0	18	2	
		Hub GTC5	15.0	18	2	
		Hub GTA1	15.0	20	2	
		Hub GTA2	15.0	20	2	
		Hub GTA3	15.0	20	2	
		Hub GTA4	15.0	20	2	
		Hub GTA5	15.0	20	2	
PL91	F-HSC-05	Hub GTC1	15.0	18	2	All release points must be monitored during commissioning of the facility. Thereafter, at least one release point must be monitored per year on a rotational basis, with all release points monitored at least once in a 6 year period.
		Hub GTC2	15.0	18	2	
		Hub GTC3	15.0	18	2	
		Hub GTC4	15.0	18	2	
		Hub GTA1	15.0	20	2	
		Hub GTA2	15.0	20	2	
		Hub GTA3	15.0	20	2	
		Hub GTA4	15.0	20	2	
		Hub GTA5	15.0	20	2	
				Hub GTA6	15.0	
Note: The above NOx release limits are applicable during all timings except start-up, shut down and calibration of emission monitoring devices. The start-up duration is allowed up to 30 minutes.						

SCHEDULE H – WASTE

General

- (H1) All general and regulated waste must only be removed from the site and sent to a facility licensed to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (H2) All regulated waste must only be removed from the site by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (H3) Waste must not be burned unless it is vegetation and is authorised in writing under the *Forestry Act 1959*.

Coal Seam Gas Water Management Plan

- (H4) Amendments to a Coal Seam Gas Water Management Plan must be submitted to the administering authority prior to its implementation.
- (H5) If, within 20 business days following the submission of the amended Coal Seam Gas Water Management Plan, the administering authority provides comments on the amended Coal Seam Gas Water Management Plan:
 - (a) due regard must be given to that comment in the finalisation of the amended Coal Seam Gas Water Management Plan; and
 - (b) the finalised amended Coal Seam Gas Water Management Plan must be submitted within 40 business days after the administering authority provided comments.

Brine and Salt Management

- (H6) Following the completion of the petroleum activity(ies), any residual brine and / or solid salt present in any structure must be removed and transported to a facility that can lawfully reuse, recycle or dispose of such waste under the *Environmental Protection Act 1994*.

Investigation into Alternative CSG Water Management Options

- (H7) For the purpose of preventing salt produced by the operations contaminating the environment, in accordance with the waste management hierarchy for the management, treatment and disposal of brine and solid salt, you must implement a Salt and Brine Management Plan that has investigated the following matters:
 - (a) the viability of waste reuse or recycling through chemically processing or treating brine or salt residues to create useable or saleable products;
 - (b) the viability of the injection of brine into a natural underground structure that is geologically isolated and does not contain groundwater and does or could supply water for potable or agricultural purposes;
 - (c) procedures for identifying and implementing opportunities to improve the CSG water management practices; and
 - (d) a report, by December 2014, detailing the outcomes of the investigations and proposed actions forward, and the final method for the beneficial use of brine and salt.

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SCHEDULE I – REHABILITATION

Decommissioning of buried pipelines

- (I1) All buried pipelines must be decommissioned in accordance with the requirements of **Australian Standard 2885**, as amended from time to time.

Decommissioning of dams

- (I2) Dams must not be abandoned but be either:
- (a) decommissioned and rehabilitated to achieve compliance with conditions (I3) and (I9); or
 - (b) be left in-situ for a **beneficial use(s)** provided that:
 - (i) it no longer contains contaminants that will migrate in to the environment; and
 - (ii) it contains water of a quality that is demonstrated to be suitable for all its intended beneficial uses; and
 - (iii) the administering authority, the holder of the environmental 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 Plan

- (I3) A Rehabilitation Plan must be developed prior to the carrying out of the petroleum activity(ies) and include strategies for the determination of final land use(s) and rehabilitation goals and details of how rehabilitation objectives will be achieved. The Rehabilitation Plan must include:
- (a) a rehabilitation hierarchy for:
 - (i) reinstating native ecosystem(s) as similar as possible to the original ecosystem(s) present prior to disturbance as the preferred option; then
 - (ii) establishing an alternative outcome with a higher environmental value than the present prior to disturbance from petroleum activities where it can be demonstrated that (I3)(a)(i) is not possible; 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 analogue² 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 those in condition (E6)(a) – (E6)(d) and will be able to measure success against the progressive and final rehabilitation criteria in this environmental authority;
 - (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;

² The latest version of the Queensland 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.

- (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) on-going maintenance program for rehabilitated areas; and
 - (xviii) rehabilitation monitoring program as required by conditions (I10) and (I11) of this environmental authority; and
- (c) timeframes for commencing rehabilitation of significantly disturbed areas that are not required for the on-going conduct of the petroleum activity(ies), not greater than three (3) months for the rehabilitation of buried pipelines and not greater than nine (9) months for any other significantly disturbed area.

Progressive Rehabilitation of Buried Pipelines

- (I4) Pipelines trenches must be backfilled immediately after pipe laying and rehabilitated as soon as practicable but not longer than three (3) months after completion.
- (I5) During backfilling of pipeline trenches, soils must be replaced so that the top two (2) soil horizons are consistent with the soil horizons of the immediately surrounding area.
- (I6) 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 which is not a weed species as a minimum to ensure that erosion is minimised.

Progressive Rehabilitation of Significantly Disturbed Land

- (I7) 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 required by condition (A8).

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- (18) Progressive rehabilitation of significantly disturbed land caused by the carrying out of the petroleum activity(ies) must:
- (a) remediate any contaminated land (e.g. contaminated soils, decommissioned dams containing salt);
 - (b) reshape all significantly disturbed land to a stable landform;
 - (c) reprofile 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 and which are not weed species;
 - (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.

Final Acceptance Criteria for Significantly Disturbed Land

- (19) 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 (3) years;
 - (iv) all significantly disturbed land is reinstated so that the distribution of vegetation communities represents the analogue site and which are not weed species;
 - (v) there is no ongoing contamination to waters;
 - (vi) there is no ongoing contamination to groundwater from dams or monocytes (demonstrated via groundwater monitoring and leak detection monitoring systems); and
 - (vii) 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 (3) years:
 - (a) the rehabilitated site shows distinct and progressive re-establishment of the various strata which characterise the vegetation community in the analogue site;
 - (b) all dominant species within each strata are re-established at densities equivalent to that of the analogue site;
 - (c) notwithstanding (19)(b)(i)(a) and (19)(b)(i)(b), a minimum of 70% **species richness** and **species diversity** is observed when compared to the relevant analogue site;
 - (d) a minimum of 50% **foliage cover** is observed when compared to the relevant analogue site;
 - (e) 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
 - (f) percent organic litter cover, count and density of hollow bearing logs and nest boxes (as replacement for trees with hollows ≥ 10 cm diameter) and fallen woody material (total length of logs ≥ 10 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 Monitoring Program

- (I10) A Rehabilitation Monitoring Program must be developed by 28 February 2013.
- (I11) 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.

Monitoring of Progressive Rehabilitation

- (I12) Regular maintenance and at least yearly monitoring of rehabilitated areas must take place to measure compliance with condition (I6) and (I8).

Monitoring of Final Rehabilitation Success

- (I13) Final acceptance criteria are deemed to be met when monitoring of rehabilitated areas demonstrate compliance with the requirements of condition (I9) for three (3) consecutive years.

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SCHEDULE J – WELL CONSTRUCTION, MAINTENANCE AND STIMULATION ACTIVITIES

Drilling Activities

- (J1) Oil based or synthetic based drilling must not be used in the carrying out of the petroleum activity(ies).
- (J2) Drilling activities must not result in the connection of the target gas producing formation and another aquifer.
- (J3) 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 gas producing formation and another aquifer as a result of drilling activities.

Stimulation Activities

- (J4) Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the reporting limit.
- (J5) Stimulation activities must not negatively affect water quality, other than that within the stimulation impact zone of the target gas producing formation.
- (J6) Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.
- (J7) The internal and external mechanical integrity of the well system prior to and during well stimulation must be ensured 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.
- (J8) 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.

Stimulation Risk Assessment

- (J9) Prior to undertaking well stimulation activities, a risk assessment be developed to ensure that stimulation activities are managed to prevent environmental harm.
- (J10) The stimulation risk assessment required must be carried out for every well to be stimulated prior to stimulation activities being carried out at that well and 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 stimulation activity to be applied, including equipment and a comparison to best international practice;
 - (b) provide details of where, when and how often stimulation 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 stimulation 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 water quality indicators relevant to stimulation 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 stimulation activities (e.g. microseismic measurements, modelling etc);
- (o) practices and procedures to ensure that the stimulation 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 stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation;
- (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 stimulation;
- (s) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation 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 stimulation 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 stimulation activities;
- (u) if used, identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities
- (v) an environmental hazard assessment of leaving stimulation chemicals in the target gas producing formation for extended periods subsequent to stimulation;
- (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 stimulation activities;
- (z) the determination of the likelihood of causing interconnectivity and/or negative water quality as a result of stimulation activities undertaken in close proximity or each other; and
- (aa) potential environmental or health impacts which may result from stimulation activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

Water Quality Baseline Monitoring

- (J11) Prior to undertaking any stimulation activity, the holder of this environmental authority must undertake a baseline bore assessment of the quality of:
- (a) all landholders' active groundwater bores (subject to access being permitted by the landholder) that are spatially within a two (2) kilometre horizontal radius from the location of the stimulation initiation point within the target gas producing formation; and
 - (b) all active landholders' 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 (2) kilometre radius from the location of the stimulation initiation point; and
 - (c) any other bore that could potentially be adversely impacted by the stimulation activity(ies) in accordance with the findings of the risk assessment required by conditions (J9) and (J10).

- (J12) Prior to undertaking stimulation activities at a well, the holder of this environmental authority must have 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 (J13).
- (J13) Stimulation baseline bore assessments required in Condition (J11) must include the minimum water quality analytes and physico-chemical parameters identified in the *Baseline Assessment Guideline* (EHP) and any restricted stimulation fluids as defined in the *Environmental Protection Act 1994*, as amended from time to time, in order to establish baseline water quality.

Stimulation Impact Monitoring Program

- (J14) A Stimulation Impact Monitoring Program must be developed prior to the carrying out of stimulation activities which must be able to detect adverse impacts to water quality from stimulation activities and must consider the findings of the risk assessment required by conditions (J9) and (J10) that relate to stimulation activities and must include, as a minimum, monitoring of:
- (a) the stimulation fluids to be used in stimulation activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used; and
 - (b) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and
 - (c) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150 % of the volume used in stimulation activities has been extracted from the stimulated well; and
 - (d) all bores in accordance with condition (J11) at the following minimum frequency:
 - i. monthly for the first six (6) months subsequent to the stimulation activities being undertaken; then
 - ii. annually for the first five (5) years subsequent to the stimulation activities being undertaken or until analytes and physico-chemical parameters listed in condition (J13) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.
- (J15) The Stimulation 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 (J13); 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 stimulation activities including chemical compounds that are actually or potentially formed by chemical reactions with each other or coal seam materials during stimulation activities.
- (J16) The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholders upon request by that landholder.

SCHEDULE K – COMMUNITY ISSUES

- (K1) A record of all complaints and actions taken in response to the valid complaint must be maintained and kept.
- (K2) The holder of this environmental authority must record the following details for all complaints received and provide this information to the administering authority on request:
- (a) name, address and contact number for complainant;
 - (b) time and date of complaint;
 - (c) reasons for the complaint as stated by the complainant;
 - (d) investigations undertaken in response to the complaint;
 - (e) conclusions formed;
 - (f) actions taken to resolve complaint;
 - (g) any abatement measures implemented to mitigate the cause of the complaint; and
 - (h) name and contact details of the person responsible for resolving the complaint.

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SCHEDULE L NOTIFICATION PROCEDURES

- (L1) The Department of Environment and Heritage Protection Pollution Hotline must be notified as soon as reasonably practicable, but within 48 hours after becoming aware of:
- (a) any unauthorised significant disturbance to land; or
 - (b) any unauthorised release of contaminants 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 coal seam gas water; or
 - (vi) 10 000 L of sewage effluent.
 - (c) a potential or actual loss of structural or hydraulic integrity of a dam; or
 - (d) when the level of the contents of any regulated dam reaches the mandatory reporting level; or
 - (e) when a regulated dam will not have available storage to meet the design storage allowance on the 1 November of any year;
 - (f) any incident where there is a potential or actual loss of well integrity (e.g. when the annulus pressure during stimulation increases by more than 3.5 MPa from the pressure immediately preceding stimulation); or
 - (g) any detection of restricted stimulation fluids from stimulation fluid monitoring; or
 - (h) any analyses result from baseline bore, well or stimulation impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource; or
 - (i) any analyses result from groundwater monitoring that exceeds trigger action investigation levels, if provided in this environmental authority.
- (L2) The notification of emergencies or incidents as required by condition (L1) must include but not be limited to the following information:
- (a) the environmental authority number and name of the holder;
 - (b) the tenure type and number where the emergency or incident occurred;
 - (c) the name and telephone number of the designated contact person;
 - (d) the location of the emergency or incident (GDA94);
 - (e) the date and time that the emergency or incident occurred;
 - (f) the date and time the holder of this environmental authority became aware of the emergency or incident;
 - (g) details of the nature of the event and the circumstances in which it occurred;
 - (h) the estimated quantity and type of any contaminants involved in the incident;
 - (i) the actual or potential suspected cause of the emergency or incident;
 - (j) a description of the land use at the site of the emergency or incident (eg. grazing, pasture, forest etc.) and/or the name of any relevant waters and other environmentally sensitive features;
 - (k) a description of the possible impacts from the emergency or incident;
 - (l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;
 - (m) any sampling conducted or proposed, relevant to the emergency or incident;
 - (n) landholder details and details of landholder consultation;
 - (o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and
 - (p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.

- (L3) Within 10 business days following the initial notification under conditions (L1) and (L2) unless a longer time is agreed to by the administering authority, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):
- (a) the root cause of the emergency or incident;
 - (b) the confirmed quantities and types of any contaminants involved in the incident;
 - (c) results and interpretation of any analysis of samples taken at the time of the emergency or incident (including the analysis results of any impact monitoring);
 - (d) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;
 - (e) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
 - (f) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
 - (g) actions and / or procedural changes to prevent a recurrence of the emergency or incident.

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SCHEDULE M - DEFINITIONS

"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 *Environmental Protection Act 1994* – 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.

"alternative arrangement" means a written agreement between the holder of this environmental authority and an affected or potentially affected person at a sensitive receptor for a defined noise nuisance impact and may include an agreed period of time for which the arrangement is in place. An agreement for alternative arrangements may include, but not necessarily be limited to a range of noise abatement measures to be installed at a sensitive receptor and / or provision of alternative accommodation for the duration of the defined noise nuisance impact.

"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 which may be required under the 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 a given rainfall total accumulated over a given duration will be exceeded in any one year.

"appraisal well" means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum.
For clarity, an appraisal well does not include an exploration well.

"areas of pre-disturbance" means areas where environmental values have been negatively impacted as a result of anthropogenic activity and these impacts are still evident. Areas of pre-disturbance may include areas where legal clearing, logging, timber harvesting, or grazing activities have previously occurred, where high densities of weed or pest species are present which have inhibited re-colonisation of native regrowth, or where there is existing infrastructure (regardless of whether the infrastructure is associated with the authorised petroleum activities). The term 'areas of pre-disturbance' does not include areas that have been impacted by wildfire/s, controlled burning, flood or natural vegetation die-back.

"associated works" in relation to a dam, means:

- o any kind and all things associated with the construction and operation of a dam; and

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- any land used for those operations.

“Australian Standard 1055” means Australian Standard 1055.1:1997 *Description and Measurement of Environmental Noise – General procedures*.

“Australian Standard 2187” means Australian Standard 2187.0:1998 *Explosives—Storage, transport and use, Part 0*, Australian Standard 2187.1:1998 *Explosives—Storage, transport and use Part 1* and Australian Standard 2187.2:2006 *Explosives—Storage and use, Part 2* or any updated versions that becomes available from time to time.

“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.

“Australian Standard 4323” means Australian Standard 4323.1:1995 *Stationary source emissions method 1: Selection of sampling positions*.

“Australian / New Zealand Standard 5667.11” means Australian / New Zealand Standard 5667.11:1998 *Water Quality – Sampling – Guidance on sampling at Groundwaters*.

“Australian / New Zealand Standard 5667.12” means Australian / New Zealand Standard 5667.12:1999 *Guidance on Sampling of Bottom Sediments for permanent, semi-permanent water holes and water storages*.

“authorised person” means a person holding office as an authorised person under an appointment under the *Environmental Protection Act 1994* by the chief executive or chief executive officer of a local government.

“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 *Waste Reduction and Recycling Act 2011*,
 - 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 Heritage Protection's *Guideline – Approval of Coal Seam Gas Water for Beneficial Use*.

“bore” means a water observation bore or a water supply bore that is either sub-artesian or artesian.

“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.

“BTEX” means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.

“bund or banded” in relation to spill containment systems for fabricated or manufactured tanks or containers designed to a recognised standard means an embankment or wall of brick, stone, concrete or other impervious material which may form part or all of the perimeter of a compound and provides a barrier to retain liquid. Since the bund is the main part of a spill containment system, the whole system (or banded area) is sometimes colloquially referred to within industry as the bund. The bund is designed to contain spillages and leaks from liquids used, stored or processed above ground and to facilitate clean-up operations. As well as being used to prevent pollution of the receiving environment, bunds are also used for fire protection, product recovery and process isolation.

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"business day" has the meaning in the *Acts Interpretation Act 1954* and *Environmental Protection Act 1994* 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; or
- a business day that occurs during the period starting on 20 December in a year and ending on 5 January in the following year.

"Category A Environmentally Sensitive Area" means any area listed in Schedule 12, part 1, section 1 of the *Environmental Protection Regulation 2008*.

"Category B Environmentally Sensitive Area" means any area listed in Schedule 12, part 1, section 2 of the *Environmental Protection Regulation 2008*.

"Category C Environmentally Sensitive Area" means any of the following areas:

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the *Nature Conservation (Koala) Conservation Plan 2006*;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Declared catchment areas under the *Water Act 2000*;
- Resources reserves under the *Nature Conservation Act 1992*
- An area identified as "Essential Habitat" or "Essential Regrowth Habitat" under the *Vegetation Management Act 1999* for a species of wildlife listed as endangered, vulnerable, rare or near threatened under the *Nature Conservation Act 1992*;
- Of Concern Regional Ecosystems identified in the database maintained by the Department of Environment and Heritage Protection called 'RE description database' containing Regional Ecosystem numbers and descriptions.

"certification or certified by a suitably qualified and experienced person" in relation to a design plan, 'as constructed' drawings or an annual report regarding dams, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what is being certified and the precise nature of that certification.
- the relevant legislative, regulatory and technical criteria on which the certification has been based;
- the relevant data and facts on which the certification has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the certification has been based using the relevant data and facts, and the relevant criteria.

"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:

- a) all relevant material has been considered in the written document; and
- b) that the content of the written document is accurate and true; and
- c) that the written document meets the requirements of the relevant conditions of the environmental authority.

"clearing" for vegetation means removing, cutting down, ringbarking, pushing over, poisoning or destroying in any way including by burning, flooding or draining; but does not include destroying standing vegetation by stock, or **lopping** a tree.

"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 defined under section 13 of the *Environmental Protection Act 1994*.

"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.

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“coal seam gas evaporation dam” is defined as a impoundment, enclosure or structure that is designed to be used to hold coal seam gas water for evaporation.

“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.

“dam” means a land-based structure or a void that is designed to contains, diverts or controls 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 *not* 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).

“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 Hazard Categories and Hydraulic Performance of Dams*, 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.

“development well” means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.

“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 *Acts Interpretation Act 1954* 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).

“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.

“equivalent person or EP” means an equivalent person under volume 1, section 2 of the *Guidelines for Planning and Design of Sewerage Schemes*, October 1991, published by the Water Resources Commission, Department of Primary Industries, Fisheries and Forestry.

“evaporation dam” means an impoundment, enclosure or structure that is designed to be used to hold CSG water for evaporation.

“existing dam” means an existing evaporation, aggregation or brine dam and any dam that is constructed and / or whose construction had substantially commenced on 2 June 2011.

“existing low hazard dam” means a low hazard dam that was constructed and/or whose construction had substantially commenced on 2 June 2011.

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“exploration well” means a petroleum well that is drilled to:

- explore for the presence of petroleum or natural underground reservoirs suitable for storing petroleum; or
- obtain stratigraphic information for the purpose of exploring for petroleum.

For clarity, an exploration well does not include an appraisal or development well.

“exploring for petroleum” means carrying out an activity for the purpose of finding petroleum or natural underground reservoirs as per section 14 of the *Petroleum and Gas (Production and Safety) Act 2004* for example including:

- conducting a geochemical, geological or geophysical survey;
- drilling a well;
- carrying out testing in relation to a well;
- taking a sample for chemical or other analysis.

“field validation surveys” means vegetation assessments undertaken in accord with the most current version of the *Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland*.

“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.

“floodplain” has the meaning in the *Water Act 2000* 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.

“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.

“foreseeable future” means the period used for assessing the total probability of an event occurring. Permanent structures and ecological sustainability should be expected to still exist at the end of a 150 year foreseeable future with an acceptably low probability of failure before that time.

“general ecologically significant wetland” otherwise known as “wetlands of other environmental value”, is a wetland that meets the definition of a wetland and that is shown as a general ecologically significant wetland or “wetlands of other environmental value” on the map of referable wetlands

“geophysical survey” means a systematic collection of geophysical data.

“hazard category” means a category, either low significant or high, into which a dam is assessed as a result of the application of tables and other criteria in *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

“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.

“high value regrowth” vegetation means

- any of the following:
 - an endangered regional ecosystem;
 - an of concern regional ecosystem;
 - a least concern regional ecosystem; and
- have not been cleared since 31 December 1989; and

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- is shown on a regrowth vegetation map.

“hydraulic fracturing” means a technique used to create cracks in underground coal seams to increase the flow and recovery of gas or oil out of a well. It involves pumping a fluid, comprised largely of water and sand, under pressure, into a coal seam. This action fractures the coal seam which provides a pathway that increases the ability for gas to flow through the coal.

“hydraulic performance” means the capacity of a regulated dam to contain or safely pass flowable substances based on a probability (AEP) of performance failure specified for the relevant hazard category *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

“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.

“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 (e.g. evaporation 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

“lake” means:

- a lagoon, swamp or other natural collection of water, whether permanent or intermittent; and
- the bed and banks and any other element confining or containing the water.

“land degradation” has the meaning in the *Vegetation Management Act 1999* and means the following:

- soil erosion
- rising water tables
- the expression of salinity
- mass movement by gravity of soil or rock
- stream bank instability
- a process that results in declining water quality.

“landfill monocell” means a specialised, isolated landfill facility where a single specific waste type is exclusively disposed (i.e. salt).

“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 *Water Act 2000*.

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

“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.

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“limit of reporting” means the lowest amount of an analyte in a sample that can be quantifiably determined with stated, acceptable precision and accuracy under stated analytical conditions (i.e. the lower limit of quantification).

“limited petroleum activities” mean any low impact petroleum activity, and:

- single well sites (includes observation, pilot, injection and production wells) up to 1 ha and associated infrastructure (water pumps and generators, sumps, flare pits or dams) located on the well site or up to 1.25 ha if the well pad includes the use of a tank (minimum 1ML) for above ground fluid storage,
- multi-well sites up to an additional (in addition to single well site above) 0.25 ha per additional well and associated infrastructure (water pumps and generators, sumps, flare pits, dams or tanks) located on the well site to a maximum of 3 ha,
- construction of new access tracks that are required as part of the construction or servicing a petroleum activity that can be lawfully carried out within an ESA or its protection zone
- upgrading or maintenance of existing roads or tracks,
- power and communication lines,
- gas gathering lines from a well site to the initial compression facility,
- water gathering lines from a well site to the initial water storage or dam,
- camps within well site that may involve sewage treatment works that are a no release works.

“linear infrastructure” means powerlines, communication, pipelines, roads and access tracks.

“long term noise event” is a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.

“lopping” a tree, means cutting or pruning its branches, but does not include —

- removing its trunk; and
- cutting or pruning its branches so severely that it is likely to die.

“low flow” means flow up to the one month average recurrence interval.

“low hazard dam” means any dam in the low hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, prepared by the Department of Environment and Heritage Protection, as amended from time to time.

“low impact petroleum activities” means petroleum activities which do not result in the clearing of native vegetation, earthworks or excavation work that cause either, a significant disruption to the soil profile or permanent damage to vegetation that cannot be easily rehabilitated immediately after the activity is completed. Examples of such activities include but are not necessarily limited to:

- chipholes
- coreholes
- geophysical surveys
- seismic surveys
- soil surveys
- topographic surveys
- cadastral surveys
- ecological surveys
- installation of environmental monitoring equipment (including surface water)

“Max $L_{pZ, 15 \text{ min}}$ ” means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

“Max $L_{pA, 15 \text{ min}}$ ” 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 *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* prepared by the Department of Environment and Heritage Protection, as amended from time to time.

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"medium term noise event" is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) 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 different 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."

"month" has the meaning in the *Acts Interpretation Act 1954* and means a calendar month and is a period starting at the beginning of any day of one (1) 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.

"oil based drilling mud" means mud where the base fluid is a petroleum product such as diesel fuel.

"overburden pressure" means the pressure or stress imposed on a layer of soil or rock by the weight of overlying material. The overburden pressure at a depth z is given by $p(z) = p_0 + \int_0^z \rho(z) dz$ where $\rho(z)$ is the density of the overlying rock at depth z and g is the acceleration due to gravity. p_0 is the datum pressure, like the pressure at the surface.

"permanent sewage treatment plant operations" means sewage treatment plant operations with a design capacity of greater than 21 but less than 450 equivalent persons carried out at one location for of a period of greater than six months in a calendar year.

"pest" means species:

- declared under the *Land Protection (Pest and Stockroute Management) Act 2002*;
- declared under Local Government model local laws; and
- which may become invasive in the future.

"prescribed storage gases" has the meaning provided in section 12 of the *Petroleum and Gas (Production and Safety) Act 2004*.

"primary protection zone" means an area within a 200 metre buffer from the boundary of any Category A, B or C Environmentally Sensitive Area.

"programmed and approved" means when the location of infrastructure has been approved by the authorised person(s) with the organisation(s).

"receiving wetland" - for the purposes of conditions (B41) to (B63) means the receiving water that has the following characteristics: off-stream ephemeral oxbow wetland system subject to grazing land use.

"reference wetland" – means a wetland that has the similar characteristics to the receiving wetland located within 50km of the receiving wetland.

"regrowth vegetation map" means a map certified by the chief executive as the regrowth vegetation map for the State and showing for the State:

- areas of regrowth vegetation, identified on the map as high-value regrowth vegetation, that—
 - are any of the following:
 - (i) an endangered regional ecosystem;
 - (ii) an of concern regional ecosystem;
 - (iii) a least concern regional ecosystem; and
 - have not been cleared since 31 December 1989; and
- particular watercourses in the Burdekin, Mackay Whitsunday and Wet Tropics catchments, identified on the map as regrowth watercourses; and
- areas the chief executive decides under section 20A1 of the *Vegetation Management Act 1999* to show on the map as high value regrowth vegetation.

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“regulated dam” means any dam in the significant or high hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, 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 hazard category as assessed using the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, published by the Department of Environment and Heritage Protection, as amended from time to time.

“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

“remnant unit” means a continuous polygon of remnant vegetation (as defined by the QLD Herbarium) representative of a single Remnant Ecosystem type or a single heterogeneous unit.

“remnant vegetation” means vegetation, part of which forms the predominant canopy of the vegetation—

- covering more than 50% of the undisturbed predominant canopy; and
- averaging more than 70% of the vegetation's undisturbed height; and
- composed of species characteristic of the vegetation's undisturbed predominant canopy cover.

“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 quantification. 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.

“restricted stimulation fluids” means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amounts prescribed under section 81B of the *Environmental Protection Regulation 2008*:

- petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene; or
- chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

The amount of any chemical is not measured in relation to water included in the restricted stimulation fluid. For clarity, the term restricted stimulation fluids only applies to fluids injected down well post-perforation.

secondary protection zone in relation to a Category A, B or C Environmentally Sensitive Area means an area within an 100 metre buffer from the boundary of a **primary protection zone**.

“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 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

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- 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 (7) 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 Schedule 12, Part 1, section 4 of the *Environmental Protection Regulation 2008*.

"site" means the relevant petroleum activity(ies) to which the environmental authority relates.

"species diversity" means the diversity within an ecological community that incorporates both species richness and the evenness of species' abundances.

"species richness" means the number of different species in a given area.

"specified relevant activities" means an environmentally relevant activity that, but for being a resource activity, would otherwise be an environmentally relevant activity under section 18 of the *Environmental Protection Act 1994*.

"spring" means the land to which water rises naturally from below the ground and the land over which the water then flows.

"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.

"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 a natural underground reservoir, including for example, hydraulic fracturing / hydrofracking, fracture acidizing and the use of proppant treatments.

"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" for the purposes of Schedule C 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 a hazard assessment of a dam, means that a statutory declaration has been made by that person and, when taken together with any attached or appended documents referenced in that declaration, all of the following aspects are addressed and are sufficient to allow an independent audit at any time:

- exactly what has been assessed and the precise nature of that assessment;
- the relevant legislative, regulatory and technical criteria on which the assessment has been based;
- the relevant data and facts on which the assessment has been based, the source of that material, and the efforts made to obtain all relevant data and facts; and
- the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

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“suitably qualified and experienced person” in relation to regulated structures means one who is a Registered Professional Engineer of Queensland (RPEQ) under the provisions of the *Professional Engineers Act 1988*, 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.

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.

“synthetic based drilling mud” means a mud where the base fluid is a synthetic oil, consisting of chemical compounds which are artificially made or synthesised by chemically modifying petroleum components or other raw materials rather than the whole crude oil.

“temporary sewage treatment plant operations” means sewage treatment plant operations with a design capacity of equal to or less than 100 equivalent persons carried out at one location for a period of no greater than six months in a calendar year.

“third party auditor” means a suitably qualified person who is either a certified third party auditor or an internal auditor employed by the holder of the environmental authority and the person is independent of the day to day management and operation of the petroleum activity(ies) covered by this environmental authority.

“threatening processes” means processes, features and actions that can have a detrimental effect upon the health and viability of an area of vegetation (e.g. altered hydrology, land use practices, invasion by pest and weed species, land degradation, edge effects and fragmentation).

“tolerable limits” means a range of parameters regarded as being sufficient to meet the objective of protecting relevant environmental values (e.g. a range of settlement for a tailings capping, rather than a single value, could still meet the objective of draining the cap quickly, preventing damage and limiting infiltration and percolation).

“topsoil” 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.

“transmissivity” means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.

“trenchless methods” means construction methods for the installation of pipelines and cables below the ground with minimal excavation. Trenchless methods can include, but not necessarily be limited to:

- moling
- pipe ramming method
- horizontal directional drilling
- utility tunneling, pipe jacking, auger boring
- microtunnelling and pipe jacking
- on-line replacement

“unacceptable risk” means those risks identified as unacceptable through a risk assessment that substantially conforms with Australian Standard 4360:2004 *Risk Management* or any updated version that becomes available from time to time.

“valid complaint” means a complaint the administering authority considers is not frivolous, nor vexatious, nor based on mistaken belief.

“visible salt” means where salt crystals accumulate on the soil surface.

“void” means any man-made, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).

“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 *Water Act 2000* and includes the bed and banks and any other element of a river, creek or stream confining or containing water.

“well infrastructure” means infrastructure required for the construction and completion of a well including but not limited to cellar pits, dams and drill sumps.

“well site” means a maximum area of land disturbance for the purposes of constructing, installing and operating an exploration, appraisal or development well or such wells as part of a multi-well arrangement and includes well lease infrastructure.

“wetland” for the purpose of this environmental authority means:

- areas shown on the *Map of Referable Wetlands* which is a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D of the *Environmental Protection Regulation 2008*; and
- are wetlands as defined under the Queensland Wetlands Program as areas of permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres, and possess one or more of the following attributes:
 - at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or
 - the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or
 - the substratum is not soil and is saturated with water, or covered by water at some time.

“Wetland of high ecological significance” otherwise known as a “high conservation value wetland”, is a wetland that meets the definition of a wetland and that is shown as a wetland of high ecological significance or high conservation value wetland on the map of referable wetlands

“year” means a period of 12 months.

“80th percentile” in relation to release limits means that not more than one (1) of the measured values is to exceed the stated release limit for any five (5) consecutive samples where:

- the consecutive samples are taken over a five (5) month period; and
- the consecutive samples are taken at approximately equal periods.

Release

Appendix 1
Existing Regulated Dams

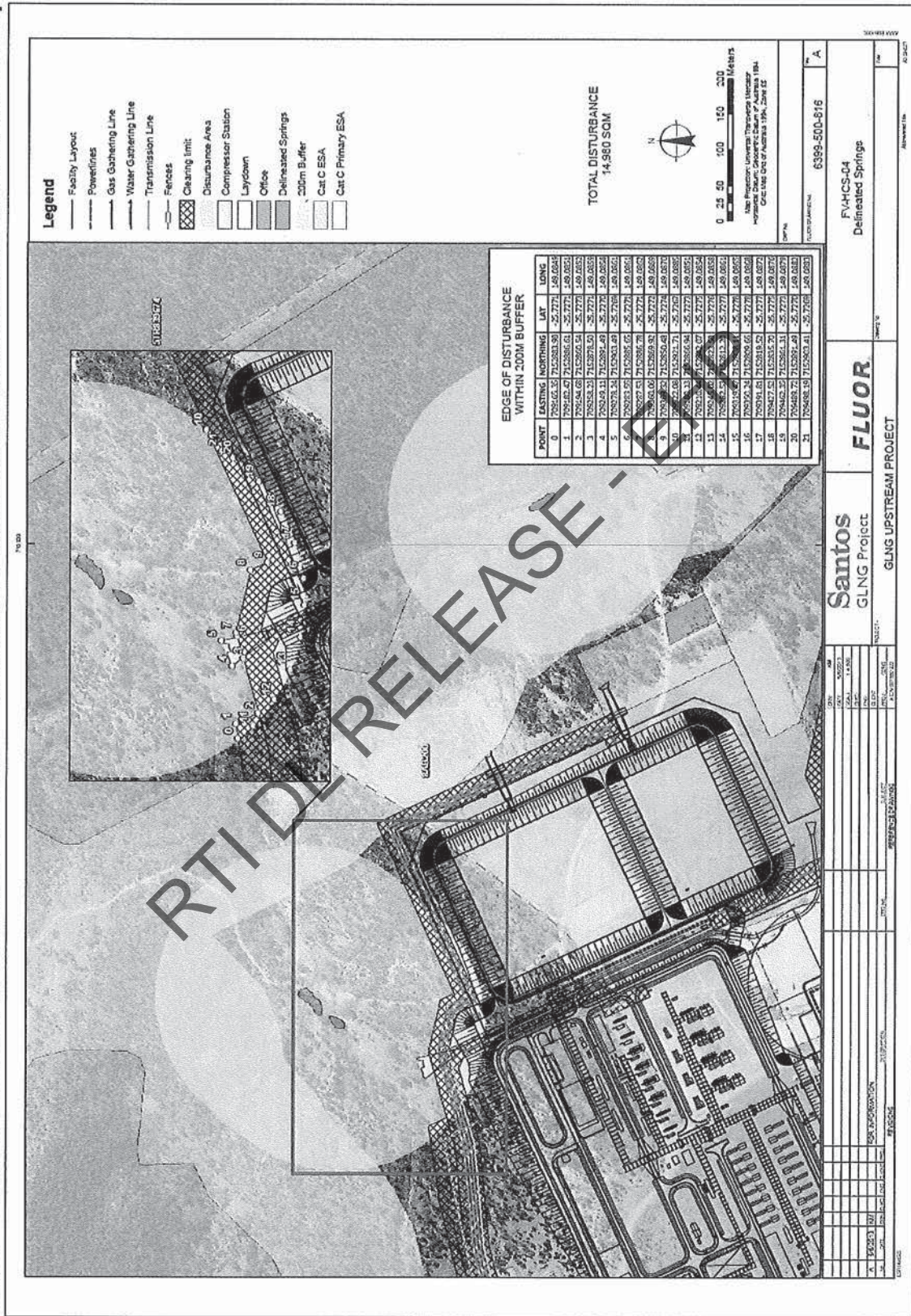
Name of Regulated Dam	MGA Zone 55 (GDA 94) 'Point' Coordinates	
	Easting	Northing
FV77 Feed Buffer	703250	7148635
FV82	706109	7146865
AWAF 2 10+15ML Feed Buffer	698537	7164185
AWAF 1 100ML Feed Buffer	695709	7150752
Spring Rock 240ML	677279	7152230

RTI DL RELEASE - EHP

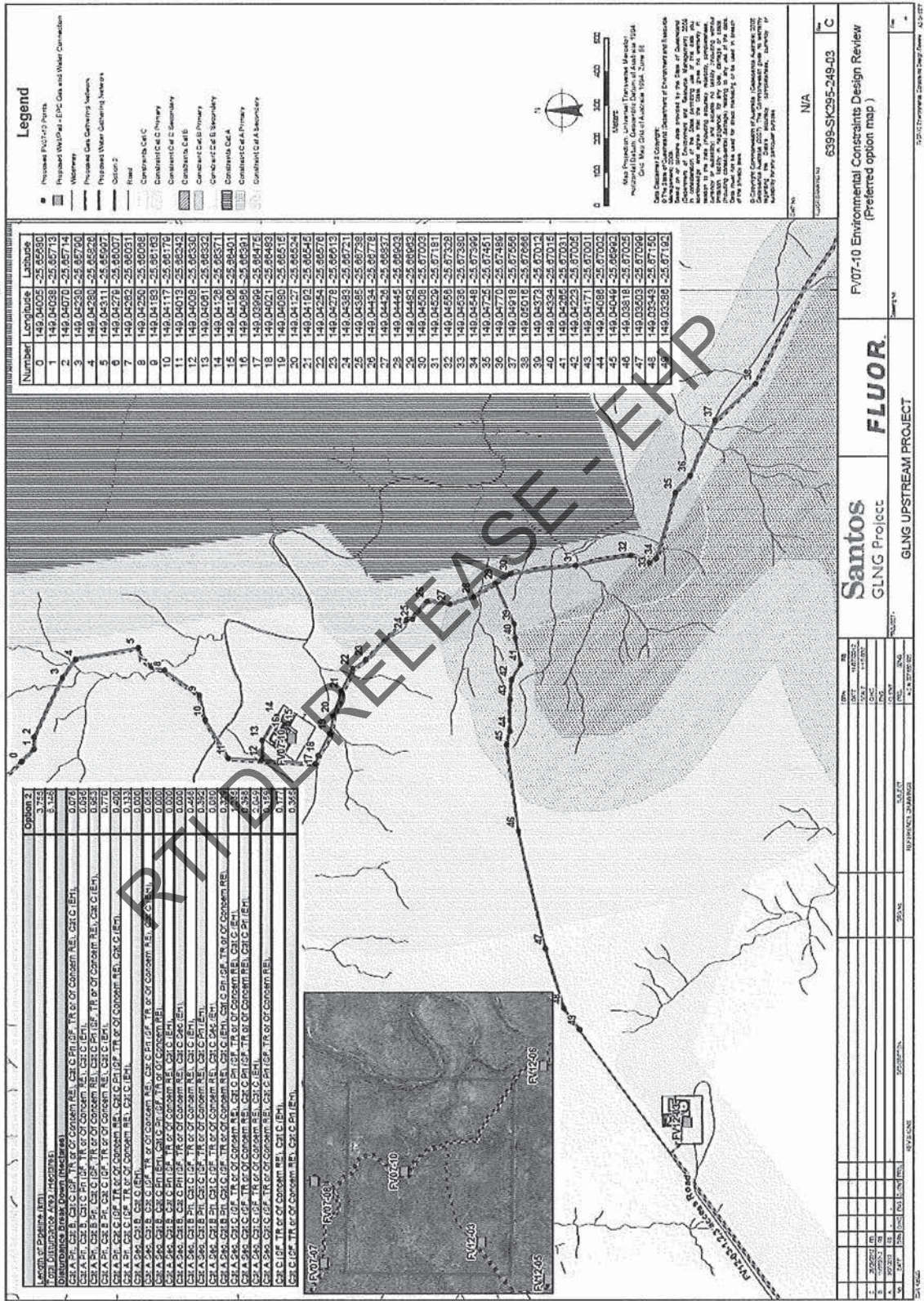
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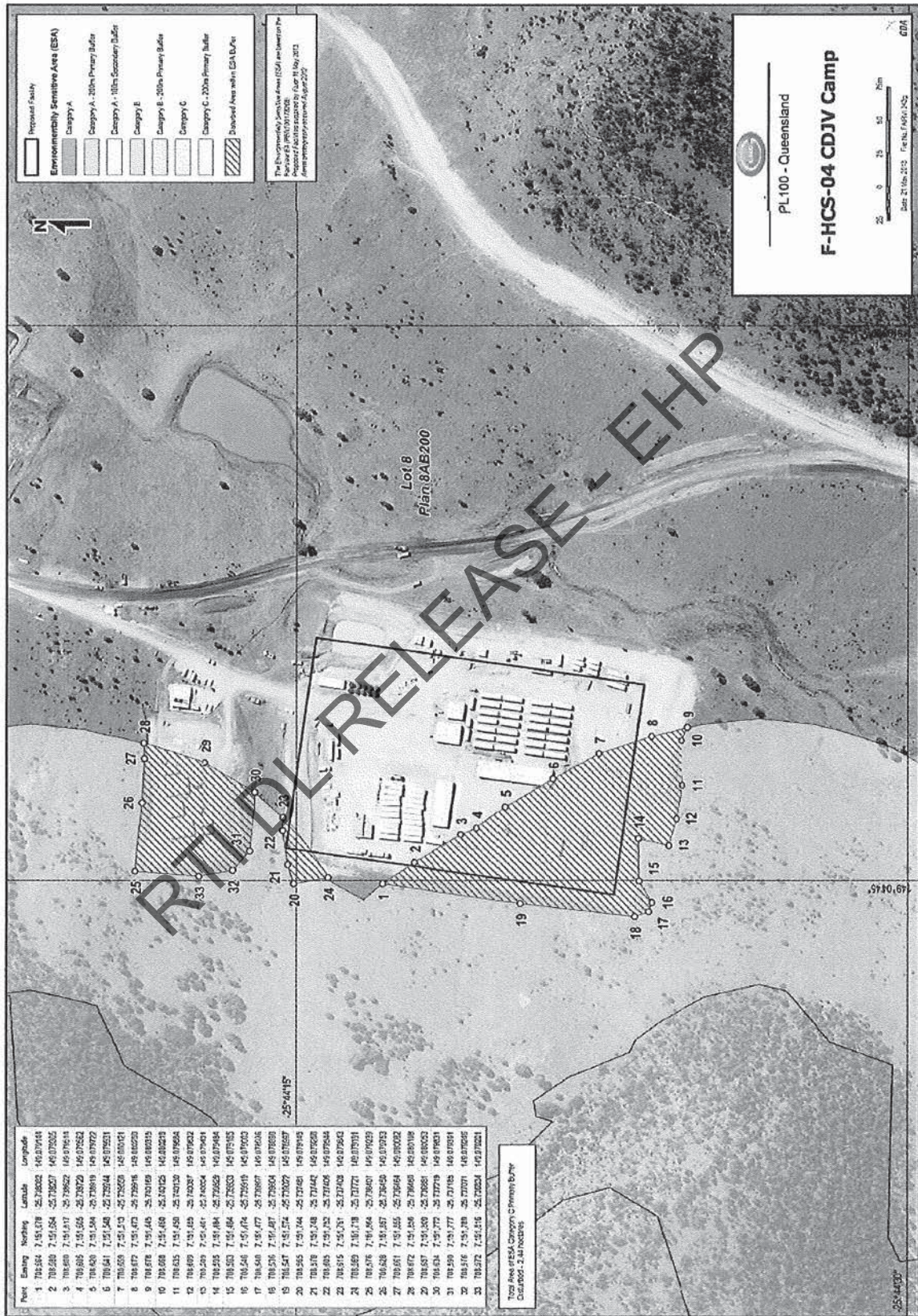
Appendix 2 – Plans referenced in Schedule B, Table 1 – Authorised Works in a Watercourse or within 200m of Springs



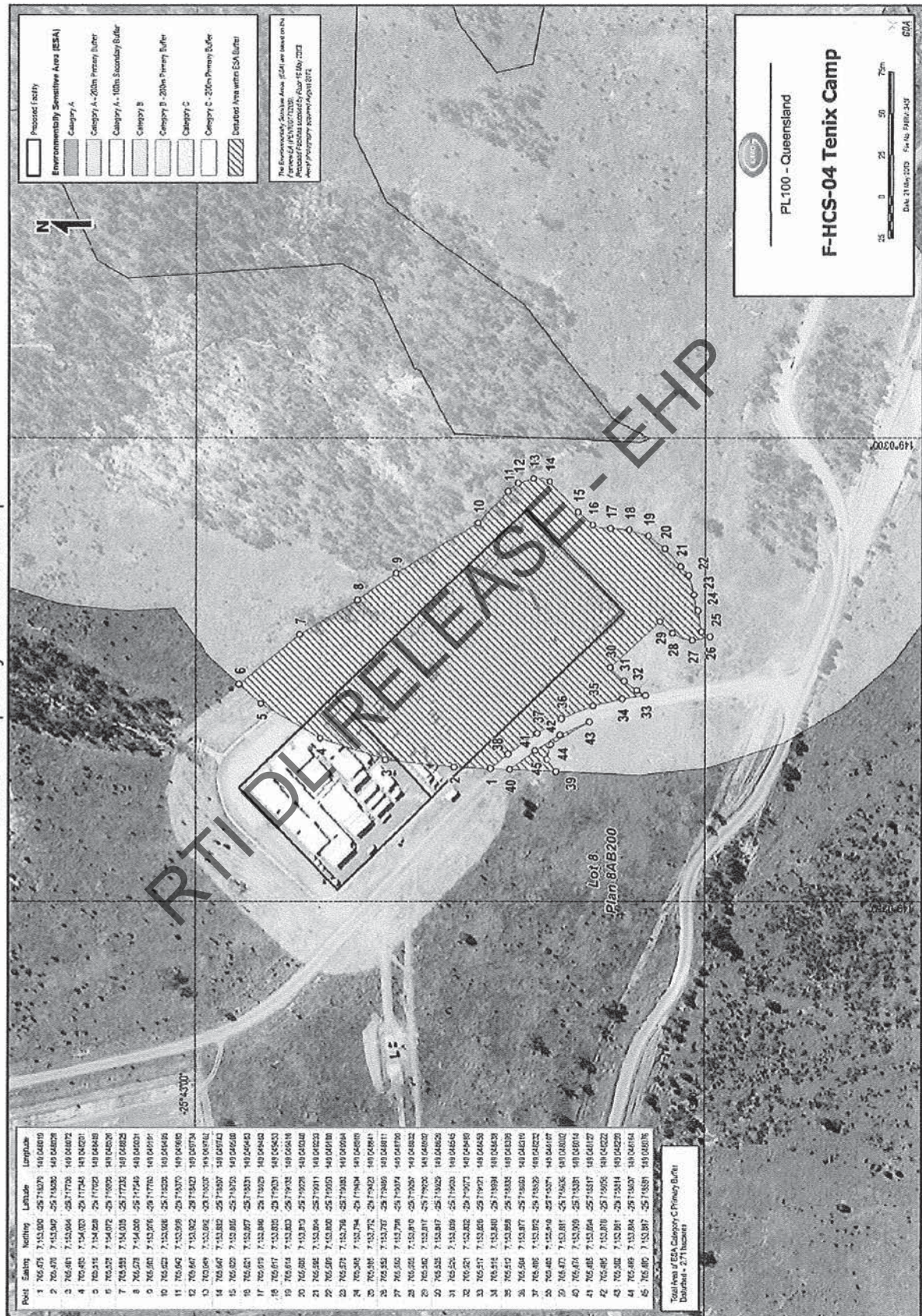
Appendix 3 – Plans referenced in Schedule E, Table 2 – Authorised Disturbance Well Pad FV530/531/532 (FV07-10) and connecting flowlines



CDJV Temporary Workers Camp and Office



Tenix Temporary Workers Camp



FKG Temporary Workers Camp



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