Permit

Environmental Protection Act 1994

Environmental authority EPPG00898213

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

Environmental authority number: EPPG00898213

Environmental authority takes effect on 30 May 2022

Environmental authority holder(s)

Name(s)	Registered address
TOTAL E & P AUSTRALIA	BGC Centre Level 13, 28 The Esplanade PERTH WA 6000
KGLNG E & P PTY LTD	BGC Centre Level 11, 28 The Esplanade PERTH WA 6000
PAPL (UPSTREAM) PTY LIMITED	c/- Addisons Commercial Lawyers Level 12, 60 Carrington Street SYDNEY NSW 2000
TOTAL E & P AUSTRALIA II	BGC Centre Level 13, 28 The Esplanade PERTH WA 6000
SANTOS CSG PTY. LTD.	Ground Floor, Santos Centre 60 Flinders Street ADELAIDE SA 5000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Item 3, Schedule 2A of the EP Reg 2008 – a petroleum activity that is likely to have a significant impact on a category A or B environmentally relevant activity	PLs 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020, ATP2017.
Item 6, Schedule 2A of the EP Reg 2008 – a petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020, ATP2017.

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Environmentally relevant activity/activities	Location(s)
Item 7, Schedule 2A of the EP Reg 2008 – a petroleum activity involving injection of a waste fluid into a natural underground reservoir or aquifer.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020, ATP2017.
Item 8, Schedule 2A of the EP Reg 2008 – a petroleum activity or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020, ATP2017.
ERA 8(3) – Chemical storage consists of storing more than 500m^3 of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 9(3b) – Hydrocarbon gas refining consists of refining natural gas or coal seam methane gas in a year 200,000,000m^3 or more of natural gas.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 10(3) – Gas producing consists of manufacturing, processing or reforming 200t or more of hydrocarbon gas in a year.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 14(1) – Electricity generation consists of generating electricity by using gas at a rated capacity of 10MW electrical or more.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 15(3) – Fuel burning consists of using fuel burning equipment that is capable of burning at least 500kg of fuel in an hour.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 55(2c) – Other waste reprocessing and treatment consists of operating a facility for receiving and reprocessing or treating, in a year, of more than 10,000t of category 2 regulated waste	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 62(1c) – Resource recovery and transfer facility consisting of operating a facility for receiving and sorting, dismantling, baling or temporarily storing category 2 regulated waste	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 63(1a-i) – Sewage treatment consisting of operating sewage treatment works, other than no-release works, with a total daily peak design capacity of 21 – 100 EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020

Environmentally relevant activity/activities	Location(s)
ERA 63(1b-i) – Sewage treatment consisting of operating sewage treatment works, other than no-release works, with a total daily peak design capacity of more than 100 but no more than 1,500 EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PLs 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020
ERA 64(3) – Water treatment consisting of treating 10ML or more of raw water in a day.	PLs, 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 323, 1019, 1020

Additional information for applicants

Environmentally relevant activities

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

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

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

Contaminated land

It is a requirement of the EP Act that an owner or occupier of contaminated land give written notice to the administering authority if they become aware of the following:

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

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

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

Take effect

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

a) if the authority is for a prescribed ERA and it states that it takes effect on the day nominated by the holder of the authority in a written notice given to the administering authority-on the nominated day; or

b) if the authority states a day or an event for it to take effect-on the stated day or when the stated event happens; or

c) otherwise-on the day the authority is issued.

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Sustainable Planning Act 2009* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

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

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

Tristan Roberts
Department of Environment and Science
Delegate of the administering authority
Environmental Protection Act 1994

Date issued: 30 May 2022

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Obligations under the *Environmental Protection Act 1994*

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

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

Environmental Authority Conditions

This environmental authority consists of the following Schedules and Appendix:

Part A
Pre-Existing Legislative Requirements and Conditions

Schedule A	General Conditions
Schedule AA	Underground Gas Storage
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	Roma Underground Gas Storage Map

Part B
Legislative Requirements and Conditions for the Santos GLNG Gas Field Development Project

Schedule A	General Conditions
Schedule B	Water
Schedule C	Land
Schedule D	Biodiversity Values
Schedule E	Waste
Schedule F	Noise
Schedule G	Air
Schedule H	Regulated Structures
Schedule I	Well Construction, Maintenance and Stimulation Activities
Schedule J	Rehabilitation
Schedule K	Notification
Schedule L	Definitions

Part A – Pre-Existing Legislative Requirements and Conditions

SCHEDULE A - GENERAL CONDITIONS

(A1) This environmental authority authorises the carrying out of the following resource activity(ies):

(a) the petroleum activities listed in Schedule A, Table 1 – Scale and Intensity for the Activities to the extent they are carried out in accordance with the activity's corresponding scale and intensity;

(b) the specified relevant activities are the ERAs which are authorised by this Environmental Authority.

(c) incidental activities that are not otherwise specified relevant activities.

Schedule A, Table 1 Scale and Intensity for the Activities

Tenure Number/s	Petroleum Activity	Scale (number of activities)	Intensity (maximum size in total)
PLs 309, 310, 313, 314, 315, 316, 317, 318, 319, 322, 1019, 1020	Coal seam gas exploration, appraisal and development wells	1460 wells	2190 ha
	Gas Injection	49 wells	73.5 ha
	Water Injection	13 wells	19.5 ha
	Compressor Station(s)	3 R-HCS-02 R-NCS-02-01 R-NCS-02-01	50 ha 2 X 30 ha
	LPG Plant	1	7 ha
	Regulated Dam(s) ≥ 400 megalitres	2	90 ha
	Regulated Dam(s) <400 megalitres	28	305 ha
	Non-Regulated Dam(s)	3161	790 ha
	Water treatment facilities that allow treated water to be released to waters other than seawater	13	≤ 48 ML/day
	Sewage Treatment Plant(s) that discharge treated effluent to an infiltration trench or through an irrigation scheme, or to	5	>100 equivalent persons (EP) ≥ 450 EP

Tenure Number/s	Petroleum Activity	Scale (number of activities)	Intensity (maximum size in total)
	land for dust suppression, construction or operational purposes.	9	>21 EP ≥ 100 EP

(A2) The resource activities in condition (A1) are authorised 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 resource activity unless a condition expressly authorises the relevant act to occur[2]. Where there is no condition, the lack of a condition must not be construed as authorising the relevant act.

1 See section 493A of the Act.

2 Section 493A(2) of the Act provides that a relevant act is unlawful unless it is authorised to be done under, among other things, an environmental authority.

Prevent or Minimise Likelihood of Environmental Harm

(A4) 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

(A5) The holder of the environmental authority must:

(a) install all measures, plant and equipment necessary to ensure compliance with the conditions of this environmental authority;

(b) maintain such measures, plant and equipment in their proper and effective condition; and

(c) operate such measures, plant and equipment in a proper and effective manner.

(A6) 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 activities.

Financial Assurance

(A7) 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

(A8) 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.

(A9) Notwithstanding condition (A9), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

(A10) An audit report must be prepared and certified by the third party auditor presenting the findings of each audit carried out.

(A11) 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.

(A12) A written response must be attached to the audit report detailing the actions taken or to be taken on stated dates:

(a) to ensure compliance with this environmental authority; and

(b) to prevent a recurrence of any non-compliance issues identified.

Contingency Procedures for Emergency Environmental Incidents

(A13) Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to:

(a) A clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.

(b) Consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.

(c) Response procedures to be implemented to prevent or minimise the risks of environmental harm occurring.

(d) The practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.

(e) Procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.

(f) Training of staff to enable them to effectively respond.

(g) Procedures to notify the administering authority, local government and any potentially impacted landholder.

Infrastructure

(A14) 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 plants;

(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

(A15) All monitoring must be undertaken by a suitably qualified person.

(A16) 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.

(A17) Any management or monitoring plans, systems, programs or procedures 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.

(A18) An annual report must be prepared each year and submitted to the administering authority in the form requested by the administering authority. This report must include but not necessarily be limited to:

(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; and

(viii) in relation to gas injection, a summary of the gas injection monitoring report.

(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);

(f) details of any exceedances with the conditions of this environmental authority and the dates and times these exceedances were reported to the administering authority; and

(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 (A17).

Surface Water Sampling Methodology

(A19) 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

(A20) 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

(A21) Noise must be measured in accordance with the prescribed standards in the *Environmental Protection Regulation 2008*.

Documentation and Records Management

(A22) A record of all documents required by this environmental authority must be kept for a minimum of five (5) years.

(A23) All plans and monitoring programs required by this environmental authority must be certified by a suitably qualified person.

(A24) All plans and monitoring programs under this environmental authority must be implemented.

SCHEDULE AA - UNDERGROUND GAS STORAGE

(AA1) The only gas authorised to be stored underground is coal seam gas and other gas of sales specification quality.

(AA2) The authorised gas must only be injected at the location(s) and within the formation(s) and impact zones depicted in Appendix 1 and listed in Schedule AA, Table 1 Details of Authorised Storage Formation.

Schedule AA, Table 1 Details of Authorised Storage Formation

Tenure	Field	Reservoir Name
PL314	Grafton Range	Grafton Range Upper Precipice
PL314	Pleasant Hills	Pleasant Hills Showgrounds
		Pleasant Hills Lower Precipice
		Pleasant Hills Upper Precipice
PL314	Pine Ridge	Pine Ridge Precipice Sandstone
PL315	Pickanjinnie	Pickanjinnie Showgrounds
		Pickanjinnie Precipice
PL315	Raslie	Raslie Precipice Sandstone
PL317	Richmond	Richmond Precipice Sandstone

(AA3) Gas injection 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 buildings and structures; or

(e) fugitive emissions.

(AA4) If environmental harm is caused or threatened to be caused, as a result of gas injection activities, gas injection must cease immediately.

(AA5) The maximum injection pressure permitted must not exceed 90 per cent of the formation fracture pressure.

(AA6) Tracers must not be injected underground.

Monitoring and Reporting Requirements for Operational Gas Injection

(AA7) The holder of this environmental authority must:

(a) continuously monitor the injection pressure and flow rate of the gas;

(b) record the daily quantity of gas injected into the formation and the cumulative volume of gas injected into the formation;

(c) monitor the pressure of the target formation at a sufficient frequency to ensure injection pressure does not exceed 90 percent of the formation fracture pressure; and

(d) in the event of anomalous pressure or volume recording, that indicates potential non-conformance with (AA3), (AA4) or (AA5) inform the administering authority within 24 hours of becoming aware.

(AA8) A Gas Injection Monitoring report must be prepared annually and include but not necessarily be limited to:

(a) A summary of the results of monitoring as required by condition (AA7);

(b) An assessment of the injection flow rates, cumulative volume of gas injected and the formation pressure;

(c) Interpretation on reservoir pressure versus gas injection volume to validate that gas is being confined to the authorised reservoirs in accordance with condition (AA7(c));

(d) Records of annual well integrity operations that indicate gas injection well integrity; and

(e) Interpretation of monitoring results as required by condition (AA7) to validate performance against the objectives of condition (AA3), (AA4) and (AA5).

Operational Gas Injection Cessation Report

(AA9) A gas 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 gas injection activities.

(AA10) The gas injection cessation report must include, but not necessarily be limited to:

(a) volumes of gas 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 operational injection activities and preventative measures for identified hazards.

SCHEDULE B - WATER

Contaminant Release

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

Erosion and Sediment Control

(B2) For activities involving significant disturbance to land, control measures that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to:

(a) preferentially divert stormwater around significantly disturbed land, or allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities;

(b) minimise soil erosion resulting from wind, rain, and flowing water;

(c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water;

(d) minimise work-related soil erosion and sediment runoff; and

(e) minimise negative impacts to land or properties adjacent to the activities (including roads).

Works in Watercourses, Wetlands and Lakes

(B3) Only construction or maintenance of linear infrastructure is permitted in or within a general ecologically significant wetland or in a watercourse.

(B4) 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 a general ecologically significant wetland 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.

(B5) The construction and maintenance of linear infrastructure authorised under condition (B3) must comply with the water quality limits specified in Schedule B, Table 1 Release Limits for Construction or Maintenance of Linear Infrastructure.

Schedule B, Table 1 Release Limits for Construction or Maintenance of Linear Infrastructure

Water Quality Parameters	Units	Water Quality Limits
Turbidity	Nephelometric Turbidity Units (NTU)	For a general ecologically significant wetland, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within a 50 m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within 50 m downstream of the construction or maintenance activity.
		For a general ecologically significant wetland, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50 m downstream of the construction or maintenance activity.
Hydrocarbons	-	For a general ecologically significant wetland, or watercourse, no visible sheen or slick

(B6) Monitoring must be undertaken at a reasonable frequency that is appropriate to demonstrate compliance with condition (B5).

(B7) 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 general ecologically significant wetland, must be provided to the administering authority at least 24 hours prior to the commencement of the significant disturbance.

(B8) Petroleum activities must occur outside a wetland of high ecological significance.

(B9) Petroleum activities must not negatively impact a wetland of high ecological significance.

(B10) 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.

(B11) 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

(B12) 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.

Well Testing

(B13) Subject to conditions (B14) and (B15) the injection of CSG water or better quality groundwater is authorised in wells that are not exploration, appraisal or development wells, for the purposes of hydraulic testing, where such hydraulic tests are undertaken for no more than two (2) consecutive days.

(B14) The maximum volume of CSG water or better quality groundwater injected for the purposes of hydraulic testing identified in condition (B13) must not exceed 1 ML per hydraulic test.

(B15) Written notification detailing the type and location (GPS coordinates) of any hydraulic testing undertaken in accordance with condition (B13) must be provided to the administering authority at least 10 business days prior to the commencement of the hydraulic test.

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 or wetland.

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 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) annual 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);

(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 annually 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 groundwater 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 only fluids authorised to be injected into an aquifer(s) are those fluid types into the aquifer formations and locations listed in Schedule BE, Table 1 Details of Authorised Fluid Injection.

Schedule BE, Table 1 Details of Authorised Fluid Injection

Well Location (easting and northing (MGA Z55))	Well Number/ Reference	Target Formation	Fluid Type	Water Quality[1](2) Impact Zone	Hydraulic Impact Zone[2]
7013142, 7071103	TBDIG01	Gubberamunda	Treated CSG water	1,500 metres	15,000 metres
701574, 7071369	TBDIG02	Gubberamunda	Treated CSG water		
702492, 7070264	TBDIG03	Gubberamunda	Treated CSG water		
703342, 7068925	TBDIG04	Gubberamunda	Treated CSG water		
703080, 7069642	TBDIG09	Gubberamunda	Treated CSG water		
703221, 7067882	RTRIG11	Gubberamunda	Treated CSG water		
700030, 7070411	PASIG05	Gubberamunda	Treated CSG water		
698073, 7069729	PASIG07	Gubberamunda	Treated CSG water		
698177, 7068384	CWRIG08	Gubberamunda	Treated CSG water		
699141, 7070866	PASIIG12	Gubberamunda	Treated CSG water		
697989, 7067415	CWRIG13	Gubberamunda	Treated CSG water		
697528, 7066628	CWRIG14	Gubberamunda	Treated CSG water		
703242, 7083206	Emu Park 1	Timbury Hills	Treated CSG water	200 metres	18,000 metres

[1] The water quality impact zone area shall be described as a polygon with boundary references specified in grid references to GDA94 and will only be applicable where the injection water quality is poorer than the target aquifer.

[2] For details on the defining the water quality impact zone and the hydraulic impact zone, refer to chapter 7.3 of the Australian Guidelines for Water Recycling: Managing Health and Environmental Risks (Phase 2) Managed Aquifer Recharge.

(BE2) The treated CSG water injection trial authorised by condition (BE1) is limited to 180 days for the injection activities at the Emu Park 1 well. The administering authority must be notified prior to the commencement of the treated CSG water injection trial.

(BE3) Treated CSG water injection into the Gubberamunda target formation authorised by condition (BE1) is limited to a period of twenty (20) years from 09 April 2014.

Well Integrity

(BE4) Unless otherwise stated in a condition of this environmental authority, injection wells must be carried out in accordance with well construction requirements in the most recent version of the Department of Environment and Resource management's standards for the construction of injection wells, as amended from time to time.

(BE5) 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, 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.

(BE6) For fluid injection:

(a) at depth less than 100 m, the injection operation must not exceed the dry overburden pressure of the base of the overlying aquitard; or

(b) at depth greater than 100 m, the injection operation must not exceed 90 percent of the formation fracture pressure.

Fluid Injection Quality

(BE7) Fluid used for the well injection activities in the Gubberamunda Target Formation, as authorised by condition (BE1) must comply with the contaminant limits prescribed in Schedule BE, Table 2 Specific Contaminant Limits for Injection Fluid (Gubberamunda Target Formation).

Schedule BE, Table 2 Specific Contaminant Limits for Injection Fluid

Water Quality Characteristics (units)	Release Limits	Limit Type	Monitoring Frequency
Electrical Conductivity (uS/cm)	1000	Maximum	Fortnightly for the first 12 month of operation, then monthly afterwards
pH (pH unit)	6.5 8.5	Range	
N-Nitrosodomethylamine (ug/L)	0.1	Maximum	
Dissolved Oxygen (mg/L)	1	Maximum	
Ammonia as N (mg/L)	0.5	Maximum	
Total nitrate as N (mg/L)	50	Maximum	
Faecal coliforms (cfu/100 ml)	1	Maximum	
Total chlorine (mg/L)	5	Maximum	
Benzene (mg/L)	0.001	Maximum	
Toluene (mg/L)	0.8	Maximum	
Ethyl benzene (mg/L)	0.3	Maximum	
Xylene (mg/L)	0.6	Maximum	
Aluminium (mg/L) (total)	0.1	Maximum	
Arsenic (mg/L) (total)	0.01	Maximum	
Beryllium (mg/L) (total)	0.06	Maximum	
Boron (mg/L) (total)	0.4	Maximum	
Cadmium (mg/L) (total)	0.002	Maximum	
Chromium (mg/L) (total)	0.05	Maximum	
Copper (mg/L) (total)	1	Maximum	
Iron (mg/L) (total)	0.3	Maximum	Fortnightly for the first 12 month of operation, then monthly afterwards
Lead (mg/L) (total)	0.01	Maximum	
Manganese (mg/L) (total)	0.1	Maximum	
Mercury (mg/L) (total)	0.001	Maximum	
Selenium (mg/L) (total)	0.01	Maximum	
Zinc (mg/L) (total)	3	Maximum	

(BE8) Fluid used for the well injection activities in the Emu Park 1 well, as authorised by condition (BE1), must comply with the contaminant limits prescribed in Schedule BE, Table 3 Specific Contaminant Limits for Injection Fluid (Emu Park 1 Well)

Schedule BE, Table 3 Specific Contaminant Limits for Injection Fluid (Emu Park 1 Well)

Water Quality Characteristics	Release Limits	Limit Type	Monitoring Frequency
Electrical	300 to 900	Range	Daily
pH (pH Unit)	6.5 8.5	Range	Daily
Dissolved oxygen (mg/L)	0.5	Maximum	Daily

Fluid Injection Quantity

(BE9) The total volume of fluid injected to the Emu Park 1 well must not exceed 180 ML over the duration of the injection trial.

(BE10) The total volume of fluid injected into the Gubberamunda Target Formation, as authorised by condition (BE1) must not exceed 24 ML/day.

Monitoring

(BE11) Monitoring for changes in groundwater pressure resulting from the CSG water injection trial at the Emu Park 1 well must be conducted. The monitoring must involve the following:

(a) the use of a minimum of three wells, accessing the following formations and locations:

(i) Timbury Hills formation within the hydraulic impact zone of the well; and

(ii) Precipice Sandstone formation within 1 km radius of the well; and

(iii) Gubberamunda formation within 1 km radius of the well.

Injection Management Plan

(BE12) An Injection Management Plan must be submitted to the administering authority prior to the carrying out of the fluid injection activities.

(BE13) The Injection Management Plan 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 other fluid 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, 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 Act 1994, Environmental Protection Regulation 2008, Environmental Protection (Water) Policy 1997 and the Queensland Water Quality Guidelines 2009;

(j) 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, wetlands, connected watercourses, faults or other geologic features likely to impact on other aquifers;

(k) a risk assessment consistent with the risk framework specified in the 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 risk assessment including details on sampling and analysis methods including frequency and locations, and quality assurance and control;

(l) verification methods to assess performance of the injection activities,

(m) control measures that will be implemented for fluid storage, treatment and injection to prevent or control the release of a contaminant or waste to the environment;

(n) the indicators or other criteria against which the performance of fluid injection will be assessed;

(o) procedures that will be adopted to regularly review the monitoring program and to report to management and the administering authority should unforeseen or non-compliant monitoring results be recorded;

(p) procedures that will be implemented to prevent unauthorised environmental harm from unforeseen or non-compliant monitoring results;

(q) procedures for dealing with accidents, spills, failure of containment structures, and other incidents that may arise in the course of fluid injection; and

(r) a program to monitor impacts on the environmental values of the receiving environment identified by condition (BE13)(j).

Reporting Requirements for Fluid Injection

(BE14) For fluid injection activities other than trials at the Emu Park 1 well as authorised under condition (BE1), a fluid injection report must be submitted to the administering authority with each annual report as required by condition (A20).

(BE15) The fluid injection report must summarise the results of the Injection Monitoring Program and provide interpretation and analysis of those results including but not necessarily being limited to:

(a) the results of the monitoring program as required by condition (BE7);

(b) monthly summaries of injection conditions;

(c) commentary on changes to injection fluid characteristics or sources;

(d) annulus performance;

(e) packer isolation tests;

(f) mechanical integrity tests;

(g) pressure of the target formation;

(h) stability of overlying aquitard;

(i) an updated risk assessment providing details on potential hazards including their inherent risk, preventative measures and monitoring, and the residual risk;

(j) quantity of fluid injected; and

(k) quality parameters of fluid injected.

Well Closure

(BE16) 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.

(BE17) 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.

(BE18) Actions outlined in the well closure plan must be completed within three (3) months of the cessation of fluid injection at the injection well.

(BE19) Upon completion of injection activities at a fluid injection well, a well closure report demonstrating compliance with the well closure plan as required by condition (BE16) for that well must be prepared by a suitably qualified person and submitted to the administering authority with the next annual report as required by condition (A20).

Injection Cessation Report

(BE20) A fluid injection cessation report must be submitted to the administering authority within four (4) months of completion of fluid injection activities.

(BE21) 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 as required by condition (BE13)(r) to assess the performance of the injection activities and preventative measures for identified hazards.

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 2 January 2014.

(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 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

(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

(c) certification from a suitable 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 specification 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 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

(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.

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 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.

Mandatory Reporting Level

(C17) The mandatory reporting level must be marked on each regulated structure in such a way that it is clearly visible 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 estimated 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 (units)	Monitoring Location	Frequency of Monitoring
pH (pH unit)	At a depth of 0.3m to 1.0m and be taken as far as practicable from the edge of the regulated structure	No earlier than August and no later than October inclusive, every year.
Electrical Conductivity (uS/cm)		
Turbidity (NTU)		
Temperature		
Dissolved Oxygen (mg/L)		
Sodium adsorption ratio (SAR)		
Aluminium (mg/L)		
Arsenic (mg/L)		
Barium (mg/L)		
Boron (mg/L)		
Cadmium (mg/L)		
Chromium (CrVI) (mg/L)		
Copper (mg/L)		
Iron (mg/L)		
Fluoride (mg/L)		
Lead (mg/L)		
Manganese (mg/L)		
Mercury (mg/L)		
Nickel (mg/L)		
Selenium (mg/L)		
Silver (mg/L)		
Strontium (mg/L)		
Tin (mg/L)		
Zinc (mg/L)		
Total phosphorus (mg/L)		
Total Nitrogen (mg/L)		
Total petroleum hydrocarbons (ug/L)		
BTEX (ug/L)		
Polycyclic aromatic hydrocarbons (ug/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; and

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(b) be assessed for the condition and adequacy of each regulated structure for dam safety and against the necessary structural, geotechnical and hydraulic performance criteria in each annual inspection.

(C24) A suitably qualified and experienced person must:

(a) prepare an annual inspection report containing details of the assessment and including recommended actions to ensure integrity of the structure; and

(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.

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.

(D7) Coal seam gas water may be transferred to a third party to be used for the following purposes subject to compliance with conditions (D8) and (D9):

(a) dust suppression;

(b) construction and operational purposes;

(c) livestock watering purposes.

(D8) Any coal seam gas water supplied to a third party for livestock watering purposes in accordance with condition (D7)(c) must meet the ANZECC and ARMCANZ Water Quality Guidelines 2000 for livestock watering purposes, as amended from time to time.

(D9) If the responsibility of coal seam gas water is given or transferred to a third party in accordance with condition (D7), the holder of the environmental authority must ensure that:

(a) the responsibility of the coal seam gas water is given or transferred in accordance with a written agreement (the third party agreement); and

(b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Sewage Treatment Works

(D10) 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 condition (D21) to condition (D23).

Conditions (D11) to (D13) apply to temporary and permanent sewage treatment work operations

(D11) Treated sewage effluent may only be released to land by large droplet or by subsurface irrigation at designated, fenced and signed contaminant release areas.

(D12) A buffer distance of 50 metres must be applied from the location of the effluent irrigation area to any watercourse, wetland or protected area and 100 metres from any potable water supply (bore or a catchment) or stock drinking water supply.

(D13) 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.

(D14) The quantity of treated sewage effluent used in accordance with condition (D10) must be determined by an appropriate method, for example, a flow meter.

Conditions (D15) to (D16) apply to temporary and permanent sewage treatment plant operations with a design capacity of greater than 21 to 100 equivalent persons

(D15) 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 for each quality characteristic.

(D16) Treated sewage effluent released to land must be monitored at the frequency and for the quality characteristics specified in Schedule D, Table 1 Treated Sewage Effluent Standards for Release to Land for each quality characteristic.

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

Quality Characteristic	Sampling and *In situ* 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		80th percentile based on at least 5 samples with not less than 30 minutes between samples	1000 cfu per 100 mL	
		Maximum	10,000 cfu per 100 mL	
pH		Range	6.0 8.5	Monthly
Dissolved Oxygen		Minimum	2 mg/L	
Electrical Conductivity		Monitor only		

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Conditions (D17) to (D20) apply only to permanent sewage treatment works operations with a design capacity of between 100 and 450 equivalent persons

(D17) Prior to construction of a sewage treatment works the minimum area of land and location to be utilised for irrigation of treated sewage effluent, excluding any necessary buffer zones, must be nominated.

(D18) All nominated locations and minimum areas of land in condition (D17) must be determined using the Model for Effluent Disposal using Land Irrigation (MEDLI) program or recognised equivalent.

(D19) A copy of results of the determinations required in condition (D18) must be submitted to the administering authority.

(D20) If, within 20 business days following the submission of the results required by condition (D19) 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 (D21) to (D23) apply only to treated sewage effluent use for the purposes of dust suppression, construction and operational purposes

(D21) 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.

(D22) 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.

(D23) All sewage effluent released to land must be monitored at the frequency and for the quality characteristics specified in Schedule D, Table 2 Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes for each quality characteristic.

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 of management of soil must be undertaken in accordance with the Soils Management Plan as amended from time to time.

(E2) A copy of 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 and Wetlands

(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 and wetlands 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 and wetlands by 8 December 2014.

(E6) Where areas mapped as environmentally sensitive areas and wetlands 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.

Schedule E, Table 1 Petroleum Activities in Environmentally Sensitive Areas

ESA Category	Within the ESA	Primary Protection Zone of the ESA	Secondary Protection of the ESA
Category A ESAs	No petroleum activities permitted	Only low impact petroleum activities permitted.	Limited petroleum activities permitted subject to condition (E12) Limited impact camps permitted subject to condition (E12) Limited impact petroleum activities subject to condition (E12)
Category B ESAs excluding Regional Ecosystems	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (E12) Limited impact camps permitted subject to condition (E12)	N/A

ESA Category	Within the ESA	Primary Protection Zone of the ESA	Secondary Protection of the ESA
		Limited impact petroleum activities subject to condition (E12)	
Category C ESAs that are Nature Refuges, Koala Habitat and/or Declared Catchment Areas	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (E12) Limited impact camps permitted subject to conditions (E10) and (E12) Limited impact petroleum activities subject to condition (E12)	N/A
Category B ESAs that Regional Ecosystems	Only limited petroleum activities permitted subject to condition (E13)	Limited petroleum activities permitted subject to condition (E12) Limited impact camps permitted subject to condition (E12) Limited impact petroleum activities subject to condition (E12)	N/A
Category C ESAs that are Essential Habitat Regional Ecosystems	Only limited petroleum activities permitted subject to condition (E13)	Limited petroleum activities permitted subject to condition (E12)	N/A

ESA Category	Within the ESA	Primary Protection Zone of the ESA	Secondary Protection of the ESA
		Limited impact camps permitted subject to conditions (E10) and (E12) Limited impact petroleum activities subject to condition (E12)	
Category C ESAs that are Regional Parks (Resource Use Area)	Only limited petroleum activities permitted subject to condition (E13)	Limited petroleum activities permitted subject to condition (E12) Limited impact camps permitted subject to condition (E12) Limited impact petroleum activities subject to condition (E12)	N/A
Category C ESAs that are State Forests and/or Timber Reserves	Only limited petroleum activities permitted subject to condition (E13) Limited impact camps permitted Limited impact petroleum activities subject to condition (E11) and (E13)	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.

Schedule E, Table 2 Authorised Petroleum Activities and Disturbances

Authorised Activity	Development Name	Location of Development (GDA94)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
Pipeline Replacement	Roma Town Gas Supply	-26.57467239 to -26.57484102	148.81652127 to 148.81678162	Approximate Length: 27m Maximum Width: 15m Area of disturbance: 0.04 ha	Category C ESA (Of Concern Regional Ecosystem (RE))
		-26.57484102 to -26.57676487	148.81678162 to 148.81931362	Length: 480m Maximum Width: 15m Area of disturbance: 0.72 ha	Category C (Of Concern RE) Primary Protection Zone
		-26.57852201 to -26.57915321	148.8367684 to 148.84072202	Length: 430m Maximum Width: 15m Area of disturbance: 0.645 ha	Category B (Endangered RE) Secondary Protection Zone
		-26.579152321 to -26.57711036	148.84072202 to 148.840766891	Length: 230m Maximum Width: 15m Area of disturbance: 0.345 ha	Category B (Endangered RE) Primary Protection Zone
Total Area of Disturbance for Pipeline Replacement					**1.75 ha**

Authorised Activity	Development Name	Location of Development (GDA94)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
CSG Re-injection Pipeline and Pleasant Hills Dam to Roma Hub 02 Dam Water transfer line	Roma Underground Storage and Pleasant Hills Dam to Roma Hub long distance water line	-26.427814 to -26.430236	149.013226 to 149.01254	Length: 276m Width: 20m Area of disturbance: 0.5591 ha	Category C (Of Concern RE) Primary Protection Zone
		-26.430236 to -26.433375	149.01254 to 149.011659	Length:360m Width: 20m Area of disturbance: 0.7110 ha	Category C ESA (Of Concern Regional Ecosystem (RE))
		-26.433375 to -26.435553	149.011659 to 149.011044	Length: 249m Width: 20m Area of disturbance: 0.4935 ha	Category C (Of Concern RE) Primary Protection Zone
		-26.435553 to -26.438237	149.011044 to 149.010292	Length:287m Width: 20m Area of disturbance: 0.4784 ha	Category C ESA (Of Concern Regional Ecosystem (RE))
		-26.438237 to -26.440709	149.010292 to 149.009599	Length: 305m Width: 20m Area of disturbance: 0.7024 ha	Category C (Of Concern RE) Primary Protection Zone
Total Area of Disturbance for CSG Re-injection Pipeline					**2.996 ha**
Water Transfer Line	Coxon Creek to Mount Hope Section 2	-26.372292 to -26.375052	149.093267 to 149.097478	Length: 739m Width: 12m Area of disturbance: 0.8868 ha	Category C ESA (Of Concern ecosystem): Primary Protection Zone
	Coxon Creek to Mount	-26.374407 to -26.375052	149.097320 to 149.097478	Length: 70m Width: 12m Area of	Category C ESA (Of Concern ecosystem)

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Authorised Activity	Development Name	Location of Development (GDA94)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
	Hope Section 3			disturbance: 0.084 ha	
	Coxon Creek to Mount Hope Section 4	-26.387917 to -26.378832	149.098679 to 149.098908	Length: 1115m Width: 12m Area of disturbance: 1.338 ha	Category B (Endangered RE) Primary Protection Zone
Total Area of Disturbance for Water Transfer Line					**2.3088 ha**
Water Transfer Pipeline and Gas Transmission Pipeline	Blyth Creek Crossing	-26.466890 -26.466915 -26.467413 -26.467290 -26.466719 -26.466393 -26.466953 -26.466979 -26.466981 -26.467267 -26.467399 -26.467403 -26.466949 -26.466960 -26.466947 -26.466843 -26.466628 -26.466929 -26.467149	149.045108 149.045231 149.045427 149.045297 149.043949 149.043937 149.046125 149.046129 149.046387 149.046396 149.046410 149.046138 149.046031 149.047503 149.047862 149.048592 149.049527 149.049510 149.048555	Length: 140m Width: 30 - 52m Area of disturbance: 0.4901 ha	Category C ESA (Of Concern ecosystem)
				Length: 430m Width: 30m - 52m Area of disturbance: 1.6265 ha	Category C ESA (Of Concern ecosystem): Primary Protection Zone
Total Area of Disturbance for Water and Gas pipelines					**2.116 ha**

Authorised Activity	Development Name	Location of Development (GDA94)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
Water Transfer Pipelines (Crossing 2)	Blyth Creek	-26.467772 (point 2) to -26.468085 (point 5) to -26.468977 (point 9) to -26.468957 (point 21)	149.037975 (point 2) to 149.037266 (point 5) to 149.037166 (point 9) to 149.037457 (point 21)	Length: 125m Width: 24m – 80m Area of disturbance: 0.3275 ha	Category C ESA (Of Concern ecosystem)
		-26.465679 (point 0) to -26.465749 (point 8) to -26.467062 (point 7) to -26.467310 (point 6) to -26.468085 (point 5) to -26.467984 (point 3) to -26.467772 (point 2) to -26.467165 (point 1) - 26.468977 (point 9) to -26.469086 (point 19) to -26.468978 (point 18) to -26.469633 (point 17) to -26.469714 (point 16) to -26.470491	149.037800 (point 0) to 149.037564 (point 8) to 149.038111 (point 7) to 149.037149 (point 6) to 149.037266 (point 5) to 149.037604 (point 3) to 149.037975 (point 2) to 149.038440 (point 1) 149.037166 (point 9) to 149.037071 (point 19) to 149.036858 (point 18) to 149.036332 (point 17) to 149.036520 (point 16) to 149.035839	Length: 525m Width: 24m - 98m Area of disturbance: 2.1243 ha	Category C ESA (Of Concern ecosystem): Primary Protection Zone

Authorised Activity	Development Name	Location of Development (GDA94)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
		(point 15) to -26.470951 (point 14) to -26.470873 (point 12) to -26.470568 (point 11) to -26.469039 (point 10) to -26.468957 (point 21)	(point 15) to 149.035847 (point 14) to 149.036096 (point 12) to 149.036090 (point 11) to 149.037431 (point 10) to 149.037457 (point 21)		
Roma hub 02 to MAR Well the Bend 3 (MAR Well Reinjection water pipeline) (Crossing 3)	Blyth Creek	-26.470737 to -26.470734	149.031174 to 149.031439	Length: 485m Width: 12m Area of disturbance: 0.5835 ha	Category C ESA (Of Concern) Primary Protection Zone
Total Area of Disturbance for Blyth Creek water transfer and reinjection pipelines					**3.035 ha**
Shared Services Pad	South West Pine Ridge	-26.561168	149.039886	Area of disturbance: 1.44 ha	Primary Protection Zone of a Category B ESA (Endangered Regional Ecosystem (RE 11.9.10))
		-26.561336	149.041078		
		-26.562402	149.040890		
		-26.562234	149.039698		
Total Area of Disturbance for Shared Services Pad					**1.44 ha**

Authorised Activity	Development Name	Location of Development (GDA20)		Size of Disturbance	ESA Affected
		Latitude	Longitude		
Tele-communica-tion tower	Binbinette tele-communica-tions tower	-26.529395 -26.530271 -26.530054 -26.529178	149.049037 149.048736 149.047823 149.048063	Area of disturbance: 1.0ha	Primary Protection Zone of a Category B ESA (Endangered Regional Ecosystem) (11.9.5))
Access track	Binbinette tower access track	-26.528067 to -26.529198	149.047328 to 149.048159	Length: 150m Width: 10m Area of disturbance: 0.15ha	Primary Protection Zone of a Category B ESA (Endangered Regional Ecosystem) (11.9.5))
Under-ground powerline	Binbinette underground powerline	-26.528067 to -26.529198	149.047328 to 149.048159	Length: 150m Width: 14m Area of disturbance: 0.21 ha	Primary Protection Zone of a Category B ESA (Endangered Regional Ecosystem) (11.9.5))
Total Area of Disturbance for Binbinette telecommunications tower, access track and underground powerline					**1.36 ha**

(E10) Limited impact camps must not be located within a primary protection zone of Category C ESA (Essential Habitat) or Category C ESA (Nature Refuges).

(E11) Limited impact petroleum activities must not be located within areas that contain commercial species.

(E12) Limited petroleum activities, limited impact camps, limited impact petroleum activities and activities authorised in Schedule E, Table 2 Authorised Petroleum Activities and Disturbances located within a primary protection zone or secondary protection zone of an environmentally sensitive area in accordance with *Schedule E, Table 1 Petroleum Activities and Schedule E, Table 2 Authorised Petroleum Activities and Disturbances* must not negatively affect the adjacent environmentally sensitive area.

(E13) Prior to carrying out limited petroleum activities or limited impact 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. clearance widths for linear infrastructure is minimised to the 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 maximum clearance widths specified in Schedule E, Table 3 Authorised Disturbance for Linear Infrastructure are not exceeded.

Schedule E, Table 3 Authorised Disturbance for Linear Infrastructure

Type of Linear Infrastructure	Clearance Width (m)
(A) Access track(s) not associated with a pipeline(s), communication lines(s) or power line(s):	
(a) single carriage access tracks	18
(b) dual carriage access tracks	21
(c) single or dual carriage access track and associated turnaround bay	35
(B) Access track(s) associated with a pipeline(s), communication line(s) or power line(s):	
(a) single carriage access tracks with a single pipeline, communication line or power line	24
(b) dual carriage access track with a single pipeline, communication line or power line.	27
(c) single or dual carriage access track and associated turnaround bay with a single pipeline, communication line or power line.	41
(d) additional clearing for any additional parallel pipeline, communication line or power line associated with (B)(a), (b) or (c)	7[1]
(C) Additional clearing for take-off drains, power line stays or turnaround bays or other work areas:	
(a) Additional clearing for power line stays associated with (B)	10
(b) additional clearing for take-off drains associated with (A) or (B)	10

[1] *Maximum total disturbance for (B) is 62m.*

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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 activity(ies) 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 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.

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;

(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 (dBA)	Medium Term Noise Event (dBA)	Long Term Noise Event (dBA)
7:00 am	6:00 pm	LAeq,adj,15 min	45	43	40
6:00 pm	10:00 pm	LAeq,adj,15 min	40	38	35
10:00 pm	6:00 am	LAeq,adj,15 min	28	28	28
		Max LpA, 15 mins	55	55	55
6:00 am	7:00 am	LAeq,adj,15 min	40	38	35

Note: The noise limits in Table 1 have been set based on the following deemed background noise levels (LABG):

- *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 LAeq, adj, 15 min.

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

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

(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.

SCHEDULE G - AIR

Fuel Burning or Combustion Equipment

(G1) Contaminants emitted from fuel burning and combustion equipment point sources that are capable of burning at least 500 kg in an hour must be directed vertically upwards.

(G2) If compressor stations R-NCS-02-01 or R-NCS-02-03 meet the definition of a fuel burning or combustion facility, the design of the facility must be capable of achieving air quality objectives for each environmental value stated in the Environmental Protection (Air) Policy 2008.

Release of Contaminants to the Atmosphere

(G3) A fuel burning or combustion facility must not be operated unless it is listed in Schedule G, Table 1 Contaminant Release Points.

(G4) The release of contaminants to the atmosphere from a point source must only occur from those release points identified in Schedule G, Table 1 Contaminant Release Points and must be directed vertically upwards without any impedance or hindrance.

Schedule G, Table 1 Contaminant Release Points

Determination Required	Release Point Numbers	Minimum Release Height (metres)	Minimum Velocity (m/sec)
Mass emission rate and concentration of oxides of nitrogen (NOx) in the flue gas at 15% O_2, dry, 0° (237 °K), 101.3 kPa oxygen reference level.	Roma HCS-02 Compressors 7667-KX-30 7667-KX-31 7667-KX-32 7667-KX-33 7667-KX-34 7667-KX-35 7667-KX-36	15	10
Mass emission rate and concentration of oxides of nitrogen (NOx) in the flue gas at 15% O_2, dry, 0° (237 °K), 101.3 kPa oxygen reference level.	Roma HCS-02 Gas Turbine Generators 7667-GX-01 7667-GX-02 7667-GX-03 7667-GX-04	15	10

(G5) Contaminants must be released to the atmosphere from a release point at a height and a flow rate not less than the corresponding height and velocity stated for that release point in Schedule G, Table 2 Contaminant Release Limits to Air.

Schedule G, Table 2 Contaminant Release Limits to Air

Release Point Number	Contaminant Release	Maximum Release Limit [1]	Frequency
Roma HCS-02 Compressors 7667-KX-30 7667-KX-31 7667-KX-32 7667-KX-33 7667-KX-34 7667-KX-35 7667-KX-36	Oxides of Nitrogen	150 mg/Nm^3 2g/s	All stacks must be monitored during commissioning (See Note 1) of the facility and once per year thereafter.
Roma HCS-02 Gas Turbine Generators 7667-GX-01 7667-GX-02 7667-GX-03 7667-GX-04	Oxides of Nitrogen	150 mg/Nm^3 2g/s	All stacks must be monitored during commissioning (See Note 1) of the facility and once per year thereafter.

Note 1: 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.

(G6) Contaminants must not be released to the atmosphere from a release point at a mass emission rate/concentration, as measured at a monitoring point, in excess of that stated in Schedule G, Table 2 Contaminant Release Limits to Air.

(G7) Contaminants must be monitored not less frequently than specified in Schedule G, Table 2 Contaminant Release Limits to Air.

(G8) Monitoring of any releases to the atmosphere required by a condition of this approval must be carried out in accordance with the following requirements:

(a) monitoring provisions for the release points listed in Schedule G, Table 1 Contaminant Release Points must comply with the Australian Standard AS 4323.1- 1995 'Stationary source emissions, Method 1: Selection of sampling positions' (or more recent editions).

(b) The following tests must be performed for each determination specified in Schedule G, Table 2 Contaminant Release Limits to Air:

(i) Gas velocity and volume flow rate;

(ii) Temperature;

(iii) Water vapour concentration (moisture content);

(c) Samples must be taken when emissions are expected to be at maximum rates;

(d) During the sampling period the following additional information must be gathered:

(i) Production rate at the time of sampling;

(ii) Raw materials and fuel used;

(iii) Number of plant or equipment and operating units operating;

(iv) Reference to the actual test methods and accuracy of the methods.

(G9) All release points referred to in Schedule G, Table 1 Contaminant Release Points must be conspicuously marked with the corresponding release point number.

(G10) Air emission monitoring must be conducted within three (3) months of commissioning the facility to demonstrate compliance with air emission limits listed in Schedule G, Table 2 Contaminant Release Limits to Air and submit the report to the administering authority.

(G11) Prior to the installation of any new or additional fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour, following the issue of this environmental authority, air dispersion modelling must be conducted to calculate the ground level concentrations of emissions from the fuel burning or combustion equipment under maximum operating conditions within the relevant airshed and identify any potential impacts to air quality within the study area.

(G12) Calculated ground level concentrations required under condition (G11) must not exceed the criteria for each air contaminant in Schedule G, Table 3 Maximum Ground Level Concentration Criteria.

Schedule G, Table 3 Maximum Ground Level Concentration Criteria

Contaminant	Concentration at 0° Celsius	Units	Averaging Time
NOx as Nitrogen Dioxide	250	ug/m^3	1 hour
NOx as Nitrogen Dioxide	33	ug/m^3	1 year
Carbon Monoxide	11	mg/m3	8 hour

(G13) Verification monitoring of the air dispersion modelling must be undertaken once fuel burning equipment that is capable of burning at least 500 kg of fuel in an hour has been commissioned.

(G14) Where the verification monitoring required under condition (G13) demonstrates that the air dispersion modelling required under condition (G11) under-predicted actual concentrations:

(a) details must be provided to the administering authority within 10 business days;

(b) modelling based on the new information must be undertaken; and

(c) appropriate pollution control measures to bring the emissions into compliance with the limits specified in Schedule G, Table 3 Maximum Ground Level Concentration Criteria must be determined and implemented.

(G15) A register of fuel burning and combustion equipment that is capable of burning at least 500 kg of fuel in an hour must be maintained and must include, as a minimum, the following information for each piece of equipment:

(a) fuel burning or combustion equipment name and location;

(b) stack emission height (metres);

(c) minimum efflux velocity (m/s);

(d) mass emission rates (g/s); and

(e) contaminant concentrations (mg/Nm^3 @ x %O_2 dry gas at 0° Celsius and 1 atmosphere)

(G16) Information contained in the register of fuel burning and combustion equipment must always be current and complete.

(G17) All entries in the register of fuel burning and combustion equipment must be certified by the chief executive officer for the tenure holder, or their delegate, as being accurate and correct.

Air Monitoring (Point Source)

(G18) A monitoring program must be conducted of contaminants released to the atmosphere at each release point recorded in the register of fuel burning and combustion equipment (condition (G15)) for the contaminants listed in Schedule G, Table 1 Contaminant Release Points and Schedule G, Table 2 Contaminant Release Limits to Air and at the frequencies specified in Schedule G, Table 4 Monitoring Frequency for Contaminants.

Schedule G, Table 4 Monitoring Frequency for Contaminants

Contaminant	Monitoring Frequency
NOx as Nitrogen Dioxide	Annual
Carbon Monoxide	Annual

(G19) The monitoring program must include, but not necessarily be limited to:

(a) monitoring provisions for the release points which complies with the most recent edition of Australian Standard 4323.

(b) tests for each sample taken at each release point specified in the register of fuel burning or combustion equipment (condition (G9)) including:

(i) gas velocity, volume and mass flow rate;

(ii) temperature; and

(iii) water vapour concentration (for non-continuous sampling);

(c) representative samples of the contaminants discharged when operating under maximum operating conditions;

(d) the collection of production rate and plant status during sampling periods; and

(e) monitoring of contaminant release carried out in accordance with the latest edition of the Department of Environment and Resource Management's *Air Quality Sampling Manual 1997*, as amended from time to time.

(G20) Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas from compression stations R-NCS-02-01 and R-NCS-02-03 must be flared in a manner that complies with all of (G20)(a) and (G20)(b) and (G20)(c) or with (G20)(d):

(a) an automatic ignition system is used; and

(b) a flame is visible at all times while the waste gas is being flared; and

(c) there is no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours; or

(d) it uses an enclosed flare.

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 dam must be removed and transported to a facility that can lawfully reuse, recycle or dispose of such waste under the Environmental Protection Act 1994.

(H7) Evaporation dams may be used for the evaporation of coal seam gas water concentrate until 1 January 2019.

Investigation into Alternative CSG Water Management Options

(H8) If evaporation dams are proposed to be used for evaporation of coal seam gas water concentrate after 1 January 2019, an evaluation of CSG water management must be undertaken, including:

(a) best practice environmental management for managing the CSG water; and

(b) feasibility of alternative ways for managing the CSG water.

(H9) The Salt and Brine Management Plan must be developed by December 2019 that has investigated the following:

(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) the outcomes of the investigations and proposed actions forward, and identified methods for the beneficial use and of brine and salt; and

(d) procedures for identifying and implementing opportunities to improve the CSG water management practices.

Residual Drilling Materials

(H10) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.

(H11) Residual drilling material can only be disposed of on-site:

(a) by mix-bury-cover method if the residual drilling material meets the approved quality criteria; or

(b) if it is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

(H12) Records must be kept to demonstrate compliance with conditions (H10) and (H11).

SCHEDULE I - REHABILITATION

Rehabilitation Planning

(I1) A Rehabilitation Plan must be developed by a suitably qualified person and must include the:

(a) rehabilitation goals; and

(b) procedures to be undertaken for rehabilitation that will:

(i) achieve the requirements of conditions (I2 to I6), inclusive; and

(ii) provide for appropriate monitoring and maintenance.

Transitional Rehabilitation

(I2) Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:

(a) contaminated land resulting from petroleum activities is remediated and rehabilitated;

(b) the areas are:

(i) non-polluting;

(ii) a stable landform;

(iii) re-profiled to contours consistent with the surrounding landform

(c) surface drainage lines are re-established;

(d) top soil is reinstated; and

(e) either:

(i) groundcover, that is not a declared pest species, is growing; or

(ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final Rehabilitation Acceptance Criteria

(I3) All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following

final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

(a) greater than or equal to 70 per cent of native ground cover species richness

(b) greater than or equal to the total per cent ground cover

(c) less than or equal to the per cent species richness of declared plant pest species

(d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then:

(i) at least one regional ecosystem(s) from the same broad vegetation group, as demonstrated by the predominant species in the ecologically dominant layer, must be present; and,

(ii) the regional ecosystem present in (I3)(d)(i) must possess an equivalent or higher conservation value (biodiversity status) than the regional ecosystem(s) in either the adjacent land or pre-disturbed land.

Final Rehabilitation Acceptance Criteria in Environmentally Sensitive Areas

(I4) Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (E4) and (E6)) must be met:

(a) greater than or equal to 70 per cent of native ground cover species richness

(b) greater than or equal to the total per cent ground cover

(c) less than or equal to the per cent species richness of declared plant pest species

(d) greater than or equal to 50 per cent of organic litter cover

(e) greater than or equal to 50 per cent of total density of coarse woody material; and

(f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Continuing Conditions

(I5) Conditions (I2), (I3) and (I4) continue to apply after this environmental authority has ended or ceased to have effect.

Remaining Dams

(I6) Where there is a dam, (including a low consequence dam) that is being or intended to be used by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Pipeline Activities

(I7) Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.

(I8) Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.

(I9) Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:

(a) a stable landform

(b) re-profiled to a level consistent with surrounding soils

(c) re-profiled to original contours and established drainage lines; and

(d) vegetated with groundcover which is not a declared pest species, and which is established and growing.

(I10) Land that has been significantly disturbed by the pipeline activities must be managed to ensure that gully erosion or subsidence do not occur on that land.

SCHEDULE J - WELL CONSTRUCTION, MAINTENANCE AND STIMULATION ACTIVITIES DRILLING ACTIVITIES

(J1) Oil based or synthetic based drilling muds 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 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 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 stimulation activities, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.

(J10) The stimulation risk assessment 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 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 chemical compounds 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 chemical compounds 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 chemical compounds used;

(ii) information on the persistence and bioaccumulation potential of the chemical compounds used;

(iii) identification of the chemicals of potential concern in stimulation fluids 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 chemical compounds in stimulation fluids 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, a baseline bore assessment must be undertaken of the water quality of:

(a) all landholder's 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 stimulation initiation point within the target gas producing formation; and

(b) all landholder's 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 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, 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 (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 hydraulic fracturing activities and must include, as a minimum, monitoring of:

(a) the stimulation fluid(s) 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 water(s) from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and

(c) flow-back water(s) from stimulation activities at sufficient frequency and accuracy to demonstrate that 150 per cent of the volume used in stimulation activities has been extracted from the stimulated well; and

(d) all bores identified in condition (J11) at the following minimum frequency:

(i) monthly for the first six (6) months subsequent to stimulation activities being undertaken; and

(ii) annually for the first five (5) years subsequent to stimulation activities being undertaken or until analytes and physico-chemical parameters identified in condition (J13) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions, whichever is shorter.

(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, identified in the respective Stimulation Risk Assessment, 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 landholder upon request by that landholder.

SCHEDULE K - COMMUNITY ISSUES

(K1) A record of all valid complaints and actions taken in response to the valid complaint must be maintained and kept.

(K2) The following details for all valid complaints received must be recorded:

(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 the 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.

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; or

(vii) 100,000 L of irrigation quality coal seam gas water, in accordance with condition D5(b), inside designated irrigation area.

(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 (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 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.

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.

"adjacent land use(s)" means the ecosystem function adjacent to an area of significant disturbance, or where there is no ecosystem function, the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.

"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.

"aggregated 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 about the way in which a particular environmental nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant 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, vegetation community attributes 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.

"analytes" means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.

"annual exceedance probability or AEP" the probability that at least one event in excess of a particular magnitude will occur in any given 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.

"approved quality criteria" for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards:

Part A In all cases:

Parameter	Maximum concentration
pH	6-10.5 (range)
Electrical Conductivity	20 dS/m (20,000 µS/cm)
Chloride*	8000 mg/L

*Chloride analysis is only required if an additive containing chloride was used in the drilling process.

The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing.

Part B If any of the following metals are a component of the drilling fluids, then for that metal:

Parameter	Maximum concentration
Arsenic	20 mg/kg
Selenium	5 mg/kg
Boron	100 mg/kg
Cadmuim	3 mg/kg
Chromium	400 mg/kg
Copper	100 mg/kg
Lead	600 mg/kg

The limits in Part B and Part C refer to the post soil/by-product mix. Part C If a hydrocarbon sheen is visible, the following hydrocarbon fractions:

TPH	Maximum concentration
C6 – C10	170 mg/kg
C10 – C16	150 mg/kg
C16 – C34	1300 mg/kg
C34 – C40	5600 mg/kg
Total Polycyclic Aromatic Hydrocarbons (PAHs)	20 mg/kg
Phenols (halogenated)	1 mg/kg
Phenols (non-halogenated)	60 mg/kg
Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes including otho, para and meta xylenes) and styrene)	7 mg/kg
Benzene	1 mg/kg

"areas of pre-existing 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:

(a) operations of any kind and all things constructed, erected or installed for that dam; and

(b) 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.

"authorised resource activities" for this environmental authority means the resource activities authorised to be carried out under condition (A1).

"background noise level" means the sound pressure level, measured in the absence of the noise under investigation, as the L A90,T being the A-weighted sound pressure level exceeded for 90 per cent 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.

"being or intended to be utilised by the landholder or overlapping tenure holder" for significantly disturbed land, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use of the land such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

"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.

For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

"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.

"bund or bunded" 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 bunded 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.

"BTEX" means benzene, toluene, ethylbenzene, ortho-xylene, paraxylene, meta-xylene and total xylene.

"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
- 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 19, part 1, section 1 of the Environmental Protection Regulation 2008.

"Category B Environmentally Sensitive Area" means any area listed in Schedule 19, 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;
- Regional parks (resource use area) under the Nature Conservation Act 1992;
- An area validated as "Essential Habitat" from ground-truthing surveys in accordance with the Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable under the Nature Conservation Act 1992;
- Of Concern Regional Ecosystems that are remnant vegetation identified in the database called 'RE description database' containing Regional Ecosystem numbers and descriptions.

"certified or certification 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.

"certified or certification" 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 remove, cut down, ringbark, push over, poison or destroy 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 moved underground in connection with exploring for, or producing coal seam gas.

"coal seam gas water concentrate" means the concentrated saline water waste stream from a reverse osmosis 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 a impoundment, enclosure or structure that is designed to be used to hold coal seam gas water for evaporation.

"commercial species" means species as listed in parts 1, 2 and 3 of Schedule 6 of the Vegetation Management Regulation 2012, which are above the diameters / sizes specified in this Schedule for each listed species.

"construction or constructed" 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 purpose of preparing a design plan.

"control measure" has the meaning in section 47 of the Environmental Protection Regulation 2008 and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.

"dam crest volume" means the volume of material (liquids and/or solids) 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 (for example, via spillway).

"declared pest species" has the meaning in the Land Protection (Pest and Stock Route Management) Regulation 2003 and is a live animal or plant declared to be a declared pest under section 36 (Declaring Pests by Regulation) or section 37(2) (Declaring Pest under Emergency Pest Notice) of that Act and includes reproductive material of the animal or plant.

"declared plant species" has the meaning in the Land Protection (Pest and Stock Route Management) Regulation 2003 and is a plant declared to be a declared pest under section 36 (Declaring Pests by Regulation) or section 37(2) (Declaring Pest under Emergency Pest Notice) of that Act and includes reproductive material of the plant.

"design plan" is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

"design storage allowance or DSA" means an available volume, estimated in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) 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).

"ecologically dominant layer" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means the layer making the greatest contribution to the overall biomass of the site and the vegetation community (NLWRA 2001). This is also referred to as the ecologically dominant stratum or the predominant canopy in woody ecosystems.

"ecosystem function" means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of the vegetation community.

"enclosed flare" means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.

"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 activities, 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" has the meaning under section 3 of the Planning Guidelines For Water Supply and Sewerage, 2005, published by the Queensland Government. It is calculated in accordance with Schedule 2, Section 63(4) of the Environmental Protection Regulation 2008 where:

- EP = V/200 where V is the volume, in litres, of the average dry weather flow of sewage that can be treated at the works in a day; or
- EP = M/2.5 where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.

"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 7 April 2012.

"existing low hazard dam" means a low hazard dam that was constructed and/or whose construction had substantially commenced on 7 April 2012.

"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 or wetland including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

"floodplains" 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 of 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.

"fuel burning or combustion facility" means a permanent fuel burning or combustion equipment which in isolation, or combined in operation, or which are interconnected, is, or are capable of burning more than 500 kg of fuel in an hour.

"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 "wetland of other environmental value" on the map of referable wetlands.

"geophysical survey" means a systematic collection of geophysical data.

"growing" means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

"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
- 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 the design criteria specified for the relevant consequence category in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

"hydraulic testing" means the testing of a geological formation to evaluate the hydrogeological characteristics of the formation.

"impulsive (for noise)" means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.

"incidental activity" for this environmental authority means an activity that is not a specified relevant activity and is necessary to carry out the activities listed in Schedule A, Table 1 – Scale and Intensity for the Activities.

"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.

"LA 90, adj, 15mins" 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.

"LAeq, adj, 15mins" 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.

"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.

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

"landholders' active groundwater bores" 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 onsite which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

"levee" means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

"limited impact camp" mean accommodation camps that:

- are temporary (no more than 6 months);
- are located within pre-existing areas of clearing or significant disturbance;
- are up to 2 ha or located within well sites; and
- may involve sewage treatment works that are no release works or release works that involve an irrigation release within pre-existing areas of clearing or significant disturbance.

"limited impact petroleum activities" means petroleum activities that are located within areas that are not a regional ecosystem and:

- are single well sites (includes observation, pilot, injection and production wells) greater than 1.25 ha; or
- are multi-well sites greater than 3 ha; and
- may involve 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; and

- may involve upgrading or maintenance of existing roads or tracks; and
- may include power and communication lines; and
- may include gas gathering lines from a well site to the initial compression facility; and
- may include water gathering lines from a well site to the initial water storage or dam.

"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, pipelines, flowlines, roads and access tracks.

"long term noise event" means 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 LpA, 15 min" means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

"Max LpZ, 15 min" means the maximum value of the Z-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 consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority.

"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.

"mix-bury-cover method" means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology:

- the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10 8m/s) or subsoil with a clay content of greater than 20%; and
- the residual solids is mixed with subsoil in the sump and cover; and the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and
- a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and
- topsoil is replaced.

"month" has the meaning in the 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" 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 $p(z) = p0 + g \int 0 \approx p(z)\, dz$ where p(z) is the density of the overlying rock at depth z and g is the acceleration due to gravity. p0 is the datum pressure, like the pressure at the surface.

"permanent sewage treatment plant operations" means a 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 Stock route Management) Act 2002;
- declared under Local Government model local laws; and
- which may become invasive in the future.

"pre-disturbed land use" means the function or use of the land as documented prior to significant disturbance occurring at that location.

"predominant species" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a species that contributes most to the overall above-ground biomass of a particular stratum.

"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 metres from the boundary of any Category A, B or C Environmentally Sensitive Area.

"prioritisation hierarchy" has the meaning provided in the Coal Seam Gas Water Management Policy, published by the Department of Environment and Heritage Protection, as amended from time to time.

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

"regional ecosystem(s)" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a vegetation community in a bioregion that is consistently associated with a particular combination geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystems Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.

"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 20AI of the Vegetation Management Act 1999 to show on the map as high value regrowth vegetation.

"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 structure in the significant or high consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority. A regulated structure does not include:

- 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;
- a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities;
- a flare pit.

"rehabilitation or rehabilitated" means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.

"reinstate or reinstatement" for pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the APGA Code of Environmental Practice: Onshore Pipelines Revision 4 (2017).

"remnant unit" means a continuous polygon of remnant vegetation (as defined by the Queensland Herbarium) representative of a single RE type or a single heterogeneous unit.

"remnant vegetation" means vegetation, part of which forms the predominant canopy of the vegetation:

- covering more than 50 per cent of the undisturbed predominant canopy; and
- averaging more than 70 per cent 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 quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L 0.02 ug/L.

"residual drilling material" means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

"resource activity(ies)" has the meaning in section 107(d) of the Environmental Protection Act 1994.

"restoration" means the replacement of structural habitat complexity, ecosystems processes, services and function from a disturbed or degraded site to that of a pre-determined or analogue site. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.

"restricted stimulation fluids" has the meaning in section 206 of the Environmental Protection Act 1994 and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation:

(a) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene

(b) 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.

"revegetation or revegetating or revegetate" means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.

"secondary protection zone" in relation to a Category A or Category B Environmentally Sensitive Area means an area within 100 metres from the boundary of the 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);
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital;
- a protected area;
- 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;
- 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; and
- for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

"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
- 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 or significant disturbance or significant disturbance to land or areas" has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if:

(a) it is contaminated land; or

(b) it has been disturbed and human intervention is needed to rehabilitate it

(i) to a condition required under the relevant environmental authority; or

(ii) if the environmental authority does not require the land to be rehabilitated to a particular condition to the condition it was in immediately before the disturbance.

"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" for this environmental activity means an activity that:

(a) but for being carried out as a resource activity, would otherwise be an activity prescribed under section 19 of the Environmental Protection Act 1994 as an environmentally relevant activity; or

(b) stimulation activities; or

(c) extracting material other than by dredging

"spillway" means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.

"stable" has the meaning in Schedule 5 of the Environmental Protection Regulation 2008 and, for a site, means the rehabilitation and restoration of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.

"stimulation" means a technique used to increase the permeability of a natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. In includes hydraulic fracturing / hydro-fraccing, fracture acidizing and the use of proppant treatments.

"stimulation fluid" means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.

"stimulation impact zone" means a 100m maximum radial distance from the stimulation target location within a gas producing formation.

"structure" for the purposes of Schedule H means a dam or levee.

"suitably qualified person" means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis to performance relative to the subject matters 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.

"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.

"suitably qualified third party" means a person who:

(a) has qualifications and experience relevant to performing the function including but not limited to:

  i. a bachelor's degree in science or engineering; and

  ii. 3 years experience in undertaking soil contamination assessments; and

(b) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2008; and

(c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.

"sump" means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.

"synthetic based drill 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).

"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 300mm in depth from the natural surface.

"total density of coarse woody material" means the total length of logs on the ground greater than or equal to 10cm diameter per hectare and number of logs on the ground greater than or equal to 10cm diameter per hectare.

"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 all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.

"visible salt" means where salt crystals accumulate on the soil surface.

"void" means any constructed, open excavation in the ground (includes borrow pits, drill sumps, frac pits, flare pits, cavitation pits and trenches).

"watercourse" has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means:

1) a river, creek or stream in which water flows permanently or intermittently
   (a) in a natural channel, whether artificially improved or not; or
   (b) in an artificial channel that has changed the course of the watercourse.

2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

"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.

"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, wetland 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
- areas defined under the Queensland Wetlands Program as 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.

  The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a Great Artesian Basin Spring or a subterranean wetland that is a cave or aquifer.

"wetland of high ecological significance" otherwise known as "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.

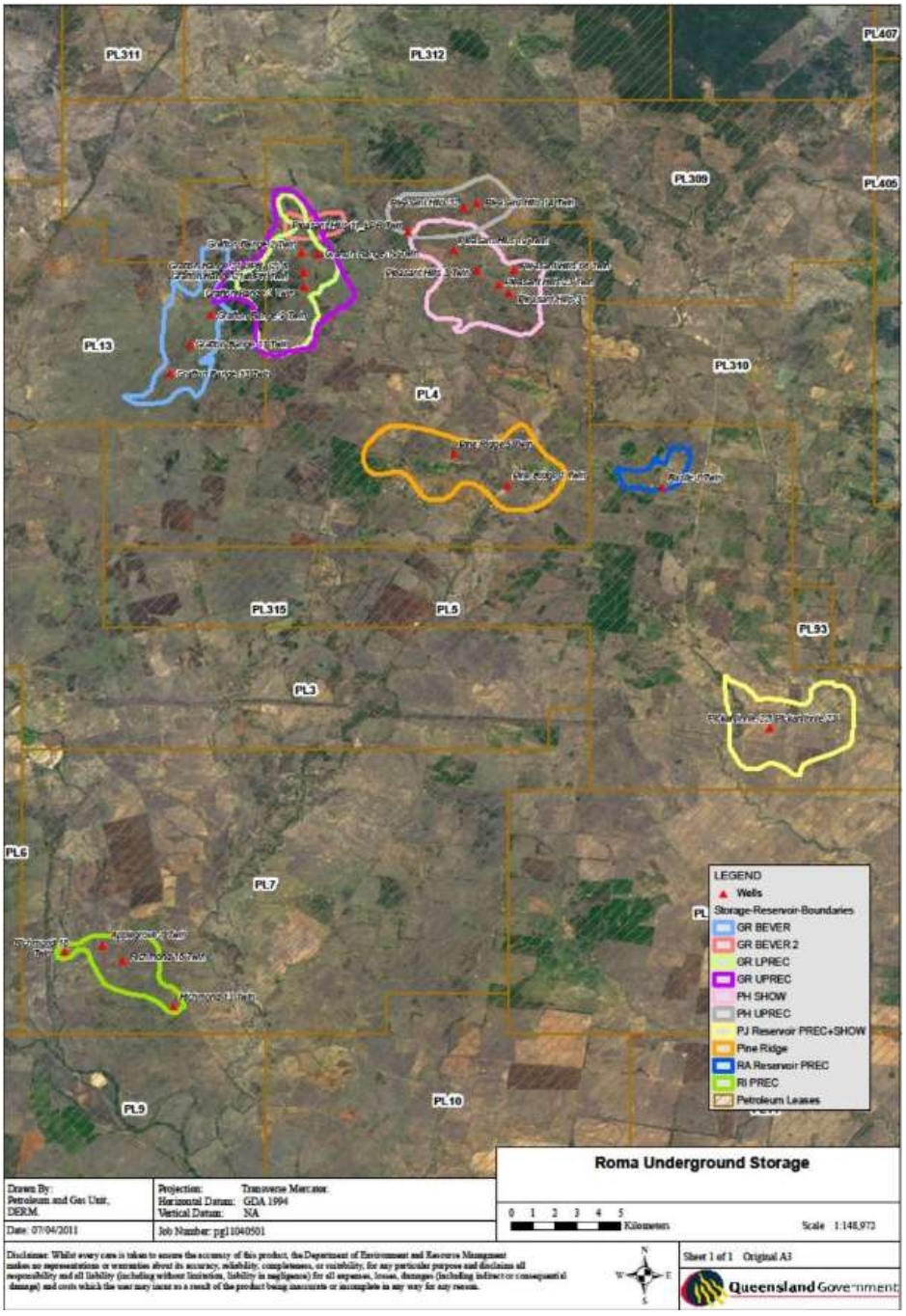
"year" means a period of 12 months.

"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.

Appendix 1 - Roma Underground Gas Storage Map



Part B – Legislative Requirements and Conditions for the Santos GLNG Gas Field Development Project

Any condition with * is a Coordinator General Stated Condition for the Santos GLNG Gas Field Development Project.

Schedule A – General

Scoping table conditions

A1 This environmental authority authorises the carrying out of the following resource activity(ies):

(a) the petroleum activities listed in Schedule A, Table 1 – Scale and Intensity for the Activities to the extent they are carried out in accordance with the activity's corresponding scale and intensity;

(b) incidental activities that are not otherwise specified relevant activities.

Table 1 – Scale and Intensity of the Activities

Project Components	**Scale** (Maximum number of activities)	**Intensity** (Maximum size of disturbed area during construction)
Wells	1838	Up to 2,757 ha
Gathering Lines/ Transmission Pipelines	As required	As required
Stimulation Activities	All wells are subject to stimulation activities	
Compressor Facilities (below the threshold of 500kg of fuel per hour)	1	Up to 8 ha

Project Components	Scale (Maximum number of activities)	Intensity (Maximum size of disturbed area during construction)
Water Treatment Facilities	1	Up to 10 ha
Access Roads	As required	Access road width up to 30m
Regulated Structures (Dams)	4	Up to 64 ha
Sewage Treatment Plant(s)	As required	5 (>100 EP <1500 EP)
		9 (>21 EP <100 EP)

A2* The resource activities in condition (A1) are authorised subject to the conditions of this environmental authority.

A3* This environmental authority authorises a relevant act[1] to occur only to the extent that:

(a) the relevant act is an ordinary consequence of carrying out the resource activities authorised by this environmental authority in accordance with its conditions; or

(b) the relevant act is specifically authorised by the conditions of this environmental authority and carrying out an activity which results in the relevant act does not contravene the conditions of this authority.

[1] See section 493A of the Environmental Protection Act 1994

Monitoring

A4* All monitoring required must be undertaken by a suitably qualified person.

A5* If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.

A6* All laboratory analyses and tests required must be undertaken by a laboratory that has NATA accreditation for such analyses and tests.

A7* Notwithstanding condition (A6), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.

A8* Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

(a) for waters and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009, Environmental Protection (Water) Policy 2009

(b) for groundwater, Groundwater Sampling and Analysis A Field Guide (2009:27 GeoCat #6890.1)

(c) for noise, the Environmental Protection Regulation 2008

(d) for air, the Queensland Air Quality Sampling Manual and/or Australian Standard 4323.1:1995 Stationary source emissions method 1: Selection of sampling positions, as appropriate for the relevant measurement

(e) for soil, the Guidelines for Surveying Soil and Land Resources, 2nd edition (McKenzie et al. 2008), and/or the Australian Soil and Land Survey Handbook, 3rd edition (National Committee on Soil and Terrain, 2009)

(f) for dust, Australian Standard AS3580.

Contingency procedures for emergency environmental incidents

A9* Petroleum activities involving significant disturbance to land cannot commence until the development of written contingency procedures for emergency environmental incidents which include, but are not necessarily limited to:

(a) A clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.

(b) Consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.

(c) Response procedures to be implemented to prevent or minimise the risks of environmental harm occurring.

(d) The practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.

(e) Procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.

(f) Training of staff to enable them to effectively respond.

(g) Procedures to notify the administering authority, local government and any potentially impacted landholder.

Maintenance of plant and equipment

A10* All plant and equipment must be maintained and operated in their proper and effective condition.

A11* The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:

(a) regulated dams and low consequence dams

(b) exploration, appraisal and development wells

(c) water treatment facilities

(d) sewage treatment facilities

(e) specifically authorised discharge points to air and waters

(f) any chemical storage facility associated with the environmentally relevant activity of chemical storage

(g) field compressor stations

(h) central compressor stations

(i) gas processing facilities; and

(j) pipeline compressor stations.

A12* Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Complaints

A13* Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.

Documentation

A14* A certification must be prepared by a suitably qualified person within 30 business days of completing every plan, procedure, program and report required to be developed under this environmental authority, which demonstrates that:

(a) relevant material, including current published guidelines (where available) have been considered in the written document

(b) the content of the written document is accurate and true; and

(c) the document meets the requirements of the relevant conditions of the environmental authority.

A15* All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.

A16* All documents required to be developed under this environmental authority must be kept for five (5) years.

A17* All documents required to be prepared, held or kept under this environmental authority must be provided to the administering authority upon written request within the requested timeframe.

A18* A record of all complaints must be kept including the date, complaint's details, source, reason for the complaint, description of investigations and actions undertaken in resolving the complaint.

Third party Audit

A19* 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.

A20* Notwithstanding condition (A19), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

A21* An audit report must be prepared and certified by the third party auditor presenting the findings of each audit carried out.

A22* 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.

A23* A written response must be attached to the audit report detailing the actions taken or to be 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.

A24* The audit report required by condition (A21) and the written response to the audit report required by condition (A23) must be submitted with the subsequent annual return.

Schedule B – Water

General

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

B2* The extraction of groundwater as part of the petroleum activities from underground aquifers must not directly or indirectly cause environmental harm to any watercourse or wetland.

Works in watercourses and wetlands

B3* Only construction or maintenance of linear infrastructure is permitted in or within a general ecologically significant wetland or in a watercourse.

B4* 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 a general ecological significant wetland 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.

B5* The construction and maintenance of linear infrastructure authorised under condition (B3) must comply with the water quality limits specified in Schedule B, Table 1 Water release limits for Construction or Maintenance of Linear infrastructure.

Schedule B, Table 1 - Water Release limits for Construction or Maintenance of Linear Infrastructure.

Water Quality Parameters	Units	Water Quality Limits
Turbidity	NTU	For a general ecologically significant wetland, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is above 45 NTU, no greater than 25% above background water turbidity measured within 50m downstream of the construction or maintenance activity.
		For a general ecologically significant wetland, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.
Hydrocarbons	-	No visible sheen

B6* Monitoring must be undertaken at a reasonable frequency to ensure compliance with condition (B5).

B7* A register must be kept of all linear infrastructure construction and maintenance activities in a wetland of other environmental value and watercourses, which must include:

(a) location of the activity (e.g. GPS coordinates (GDA94) and watercourse name)

(b) estimated flow rate or surface water at the time of the activity

(c) duration of work

(d) results of impact monitoring carried out under condition (B6).

B8* Petroleum activities must occur outside a wetland of high ecological significance.

B9* Petroleum activities must not negatively impact a wetland of high ecological significance.

B10* 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.

B11* 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

B12* Where the petroleum activity is carried out on floodplains the petroleum activity 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.

Seepage monitoring program

B13* A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants by no longer than 3 months following the effective date of this environmental authority.

B14* The seepage monitoring program required by condition (B13) must include but not necessarily be limited to:

(a) identification of the containment facilities for which seepage will be monitored

(b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities as provided for in condition (B15).

(c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities

(d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts

(e) installation of seepage monitoring bores that:

(i) are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact)

(ii) provide for the early detection of negative impacts prior to reaching groundwater dependent ecosystems bores, or water supply bores

(iii) provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)

(f) monitoring of groundwater at each background and seepage monitoring bore at least quarterly for the trigger parameters identified in condition (B15)

(g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (B15) and (B14)(c) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination

(h) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and

(i) provides for annual updates to the program for new containment facilities constructed in each annual return period.

B15* Seepage monitoring bores identified in (B14)(b) must be monitored quarterly for the trigger parameter(s) specified in Schedule B, Table 2 Seepage Monitoring Trigger Parameters.

Schedule B, Table 2 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	-	-

Seepage monitoring bore drill log

B16* A bore drill log must be completed for each seepage monitoring bore in condition (B14) which must include:

(a) bore identification reference and geographical coordinate location

(b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details

(c) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters

(d) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and

(e) target formation of the bore.

Well testing

B17* Subject to condition (B18) and condition (B19), the injection of CSG water or better quality groundwater is authorised in wells that are not exploration, appraisal or development wells, for the purposes of hydraulic testing, where such hydraulic tests are undertaken for no more than two (2) consecutive days.

B18* The maximum volume of CSG water or better quality groundwater injected for the purposes of hydraulic testing identified in condition (B17) must not exceed 1ML per hydraulic test.

B19* Written notification detailing the type and location (GPS coordinates) of any hydraulic testing undertaken in accordance with condition (B17) must be provided to the administering authority at least 10 business days prior to the commencement of the hydraulic test.

Schedule C – Land

General

C1* Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.

Top soil management

C2* Top soil must be managed in a manner that preserves its biological and chemical properties.

Erosion and sediment control

C3* For activities involving significant disturbance to land, control measures that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to:

(a) preferentially divert stormwater around significantly disturbed land, or allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities;

(b) minimise soil erosion resulting from wind, rain, and flowing water;

(c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water;

(d) minimise work-related soil erosion and sediment runoff; and

(e) minimise negative impacts to land or properties adjacent to the activities (including roads).

Land management

C4* Land that has been significantly disturbed by the pipeline activities must be managed to ensure that gully erosion or subsidence do not occur on that land.

Chemical storage

C5* Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.

Pipeline operation and maintenance

C6* Contaminants authorised to be released to land under conditions (C7), (C9), and (C15) must be carried out in a manner that ensures:

(a) vegetation is not damaged;

(b) soil quality is not adversely impacted;

(c) there is no surface ponding or runoff beyond the designated release area;

(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.

Pipeline wastewater

C7* Contaminants that are hydrostatic test water from pipelines and contaminants from low point drains, may be released to land in accordance with condition (C6).

C8* Produced water may be re-used in:

(a) drilling and well hole activities; or

(b) stimulation activities.

C9* Produced water may be released to land for the following purposes:

(a) dust suppression;

(b) construction and operational purposes for the petroleum activity authorised by this environmental authority; and

(c) irrigation.

C10* Produced water irrigated to land must:

(a) not exceed the release limits specified in Schedule C, Table 1a Irrigation water quality monitoring; and

(b) be monitored at the frequency and for the quality characteristics at the monitoring point specified in Schedule C, Table 1a - Irrigation water quality monitoring; or

(c) the process under (C11) has been completed.

C11* Produced water for irrigation which does not meet criteria in condition (C10) (a) and (b) may be used for irrigation provided a report has been completed which:

(a) determines soil structure, stability and productive capacity will be maintained or improved;

(b) determines there are no toxic effects to crops;

(c) determines yields and produce quality are maintained or improved;

(d) states water quality criteria, which has been determined in accordance with the assessment procedures outlined in Schedule C, Table 1b Assessment procedures for water quality criteria; and

(e) includes a water monitoring program to ensure that condition (C11) (a)(b) and (c) are being achieved.

Schedule C, Table 1a - Irrigation water quality monitoring

Quality Characteristic	Release Limit	Limit Type	Frequency	Monitoring Point
Electrical conductivity (EC)	<950 µs/cm^3	95th percentile over a one-year period	Fortnightly	At a location following final treatment and prior to release.
Sodium adsorption ratio (SAR) for heavy soils	≤6			
SAR for light soils	≤12			
pH	6.0 - 8.5			
Aluminium	20 mg/L	Maximum	Bi-annually	
Arsenic	2.0 mg/L			
Boron	Refer to table 9.2.18 of ANZECC	Refer to table 9.2.18 of ANZECC		
Cadmium	0.05 mg/L	Maximum		
Chromium	1 mg/L			
Cobalt	0.1 mg/L			
Copper	5 mg/L			
Fluoride	2 mg/L			
Iron	10 mg/L			
Lithium	2.5 mg/L			
Lead	5 mg/L			
Manganese	10 mg/L			
Mercury	0.002 mg/L			
Molybdenum	0.05 mg/L			
Nickel	2 mg/L			
Zinc	5 mg/L			

Schedule C, Table 1b Assessment procedures for water quality criteria

Water Quality Criteria	Assessment Procedure
electrical conductivity sodium adsorption ratio pH	Salinity Management Handbook, with reference to Chapter 11; and/or Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapter 4 and Volume 3 Chapter 9. The assessment should consider: • soil properties within the root zone to be irrigated (e.g. clay content, cation exchange capacity, exchangeable sodium percentage) • water quality of the proposed resource (e.g. salinity, sodicity) • climate conditions (e.g. rainfall) • leaching fractions • average root zone salinity (calculated) • crop salt tolerance (e.g. impact threshold and yield decline) • management practices and objectives (e.g. irrigation application rate, amelioration techniques) • broader landscape issues (e.g. land use, depth to groundwater) • any additional modelling and tests undertaken to support the varied water quality parameters.
heavy metals	Australian and New Zealand Guidelines for Fresh and Marine Water Quality, with reference to Volume 1 Chapters 3 and 4 and Volume 3 Chapter 9. The assessment should aim to derive site specific trigger values (e.g. cumulative contaminant loading limit) based on the methodology provided in the above mentioned procedure.

C12* Produced water may be used for domestic or stock purposes provided the water quality complies with the criteria specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000).

C13* Produced water may be transferred to a third party to be used for the following purposes, subject to condition (C14):

(a) dust suppression;

(b) construction and operational purposes; or

(c) domestic or stock purposes provided the water quality complies with criteria specified in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC and ARMCANZ 2000).

C14* If the responsibility of produced water is given or transferred to a third party in accordance with condition (C13), the holder of the environmental authority must ensure:

(a) the responsibility of the produced water is given or transferred in accordance with a written agreement (third party agreement);

(b) the third party is made aware of the General Environmental Duty under section 319 of the Environmental Protection Act 1994.

Sewage treatment works

C15* Greywater or treated sewage effluent from a treatment system with a daily peak design capacity of up to 450 EP may be:

(a) released to land by sub-surface or spray irrigation provided it is to a fenced and signed contaminant release area that is:

(i) a minimum distance of 50 metres from any watercourse, wetland or protected area; and

(ii) a minimum distance of 100 metres from any potable water supply or stock drinking water supply; and

(iii) kept vegetated with groundcover that is not a prohibited or restricted pest species; or

(b) used for dust suppression, construction or operational purposes subject to condition (C22).

C16* 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.

Sewage treatment works between 100 EP and 450 EP.

C17* Prior to construction of a sewage treatment works with a daily peak design capacity of greater than 100EP, the minimum area of land and location to be utilised for irrigation of treated sewage effluent, excluding any necessary buffer zones, must be nominated.

C18* All nominated locations and minimum areas of land in condition (C17) for sewage treatment works with a daily peak design capacity of greater than 100EP, must be determined using the Model for Effluent Disposal using Land Irrigation (MEDLI) program or recognised equivalent and use model inputs representative of the activity and release location including but not limited to effluent quality, soil and vegetation types, and climatic conditions.

C19* Treated sewage effluent must only be released to the nominated locations and minimum areas of land determined by the MEDLI program or recognised equivalent identified in condition (C18).

C20* Treated sewage effluent released to land must comply, at the monitoring point(s), with each of the release limits specified in Schedule C, Table 2 Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP for each quality characteristic.

C21* Treated sewage effluent released to land must be monitored at the frequency and for the quality characteristics specified in Schedule C, Table 2 Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP for each quality characteristic.

Schedule C, Table 2 Treated sewage effluent standards for release to land from sewage treatment works with a daily peak design capacity of greater than 100EP

Quality Characteristic	Release Limit	Limit Type	Frequency	Monitoring Point
5-day Biochemical oxygen demand (BOD)	20 mg/L	Maximum	Quarterly	Release pipe from sewage treatment works
E. coli	1000 cfu per 100 mL	80th percentile based on at least 5 samples with not less than 30 minutes between samples		
	10,000 cfu per 100 mL	Maximum		
pH	6.0 - 8.5	Range	Monthly	
Dissolved Oxygen	2 mg/L	Minimum		
Electrical Conductivity		Monitor only		

Treated sewage effluent use for the purposes of dust suppression, construction and operational purposes

C22* Treated sewage effluent 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;

(b) on local government controlled roads, written approval from the relevant Local Government has been given to the holder of this environmental authority; and

(c) the treated sewage effluent quality:

(i) is monitored at the location and frequency specified in Schedule C, Table 3 Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes; and

(ii) meets the release limits for each quality characteristic specified in Schedule C, Table 3 Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes.

Schedule C, Table 3 – 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	Treated sewage effluent storage	Range	6.0 to 8.5	Weekly until 12 months of monitoring demonstrates no exceedances of the release limits. Monthly monitoring can occur thereafter.
5-day Biochemical Oxygen Demand (BOD)		Median	20 mg/L	
Electrical Conductivity		Maximum	1600 uS/cm	
Turbidity		95%ile (max)	2 (5) NTU	
Total Suspended Solids		Median	5 mg/L	
E. coli		Median	<10 cfu per 100 mL	Weekly

Schedule D – Biodiversity Values

Confirming biodiversity values

D1* Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground environmentally sensitive areas and wetlands at that location must be undertaken by a suitably qualified person.

D2* A suitably qualified person must develop and certify a methodology so that condition (D1) can be complied with and which is appropriate to confirm on-the-ground environmentally sensitive areas and wetlands.

D3* Where areas mapped as environmentally sensitive areas and wetlands differ from those confirmed under conditions (D1) and (D2), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on the- ground values.

D4 * All documentation survey information photographs, field data or any material associated with the field validation requirements in (D1) 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 (D2).

D5* The location of the petroleum activity 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 result in land degradation

(d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and

(e) in order of preference, avoid then minimise clearing of native mature trees.

Disturbance to land environmentally sensitive areas

D6* Petroleum activities must be carried out in accordance with Schedule D, Table 1 Petroleum Activities in Environmentally Sensitive Areas and any other relevant conditions of this environmental authority.

Schedule D, 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.	Limited petroleum activities permitted subject to condition (D10) **Limited impact camps** permitted subject to condition (D10) **Limited impact petroleum activities** permitted subject to condition (D10)
Category B ESAs excluding 'Endangered' Regional Ecosystems	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	

Queensland Government

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Category C ESAs that are Nature Refuges, Koala Habitat and/or Declared Catchment Areas	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to conditions (D7) and (D10) Limited impact petroleum activities permitted subject to condition (D10)	
Category B ESAs that are 'Endangered 'Regional Ecosystems	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	
Category C ESAs that are Essential Habitat, Essential	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10)	

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Regrowth Habitat and/or 'Of Concern' Regional Ecosystems		Limited impact camps permitted subject to conditions (D7) and (D10) Limited impact petroleum activities permitted subject to condition (D10)	
Category C ESAs that are Regional Parks (Resource Use Area)	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	
Category C ESAs that are State Forests and/or Timber Reserves	Limited petroleum activities permitted subject to condition (D11) Petroleum activities that are extraction activities and screening activities permitted.		

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
	Limited impact camps permitted. Limited impact petroleum activities permitted subject to conditions (D8) and (D11)		

D7* Limited impact camps must not be located within a primary protection zone of Category C ESA (Essential Habitat) or Category C ESA (Nature Refuges).

D8* Limited impact petroleum activities must not be located within areas that contain commercial species.

D9* Despite condition (D6) decommissioning petroleum activities are authorised within all ESAs other than Category A ESAs, and within all ESA protection zones when conducted in accordance with the land disturbance planning principles provided in condition (D5).

D10* Limited petroleum activities, limited impact camps or limited impact petroleum activities located within a primary protection zone or secondary protection zone of an environmentally sensitive area in accordance with Schedule D, Table 1 Petroleum Activities in Environmentally Sensitive Areas must not negatively affect the adjacent environmentally sensitive area.

D11* Prior to carrying out limited petroleum activities or limited impact petroleum activities undertaken within environmentally sensitive areas in accordance with Schedule D, Table 1 Petroleum Activities in Environmentally Sensitive Areas, it must be demonstrated, in the following order of preference that:

(a) no reasonable or practicable alternative exists for carrying out the limited petroleum activities within the environmentally sensitive area;

(b) the limited petroleum activities are preferentially located in pre-existing areas of clearing or significant disturbance;

(c) clearance widths for linear infrastructure is minimised to the maximum extent possible, taking into account the following matters:

(i) safe vehicle movement;

(ii) drainage devices installed are of a type that is appropriate for the track type and location;

(iii) erosion and sediment control measures installed are in accordance condition (B2); and

(iv) power line stays have been preferentially located within the pipeline right of way where possible.

(d) the maximum clearance widths specified in Schedule D, Table 2 Authorised Disturbance for Linear Infrastructure are not exceeded.

Schedule D, Table 2 Authorised Disturbance for Linear Infrastructure

Type of Linear Infrastructure	**Clearance width (m)**
(A) Access track(s) not associated with a pipeline(s), communication lines(s) or power line(s):	
(a) single carriage access tracks	18
(b) dual carriage access tracks	21
(c) single or dual carriage access track and associated turnaround bay	35
(B) Access track(s) associated with a pipeline(s), communication line(s) or power line(s):	
(a) single carriage access tracks with a single pipeline, communication line or power line	24
(b) dual carriage access track with a single pipeline, communication line or power line.	27
(c) single or dual carriage access track and associated turnaround bay with a single pipeline, communication line or power line.	41
(d) additional clearing for any additional parallel pipeline, communication line or power line associated with (B)(a), (b) or (c)	7[1]

Type of Linear Infrastructure	Clearance width (m)
(C) Additional clearing for take-off drains, power line stays or turnaround bays or other work areas:	
(a) Additional clearing for power line stays associated with (B)	10
(b) additional clearing for take-off drains associated with (A) or (B)	10

[1] Maximum total disturbance for (B) is 62m.

Offset Delivery

D12* An Offset Plan must be prepared in accordance with section 5 of the Offset Strategy at Appendix AB of the final environmental impact statement (EIS) decided by the Coordinator-General on 3 September 2015. After a decision under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) and three (3) months prior to any construction activities, the proponent must submit the Offset Plan to the Department of Environment and Science. The Offset Plan must consider offsets for any significant residual impacts to the following ecological receptors:

(i) regional ecosystems listed as endangered (biodiversity status)

(ii) regional ecosystems listed as of concern (biodiversity status)

(iii) essential habitat

(iv) wetlands of general ecological significance.

The Offset Plan must:

(a) detail how the specific offset requirements conditioned by the Commonwealth Minister for the Environment in any approval for the project under the EPBC Act will be delivered

(b) detail proposed offsets to address any significant residual impacts for the ecological receptors at condition (D12) (i)-(iv)

(c) include, but not necessarily be limited to:

(i) a detailed description of the land to which the plan relates, the values affected and the extent and likely timing of impact on each value

(ii) evidence that values impacted can be offset

(iii) the method for delivering the offset, including consideration of land-based offsets, direct benefit management plans, offset transfers and/or offset payments and other tenure activities

(d) ensure a legally binding mechanism to protect and manage offset areas

(e) include a staging plan to demonstrate how offsets will be delivered and managed over the life of the project

(f) consider existing, proposed and future offsets prepared and/or planned under the existing environmental authorities pertaining to the project area.

Maximum Disturbance

D13* Disturbance to ecological receptors listed in Schedule D, Table 3 Maximum disturbance limits to ecological receptors, must not exceed the relevant maximum disturbance limits.

Schedule D, Table 3 Maximum disturbance limits to ecological receptors

Ecological Receptor	Maximum disturbance area for Roma Project Area (ha)
Endangered vegetation (REs and high value regrowth) (biodiversity status)	153.2
Of-concern vegetation (REs and high value regrowth) (biodiversity status)	820.8
Essential habitat	2.8
Wetlands (general ecological significance)	49.4
Resource reserves	0
State forest and timber reserves	54.8

Schedule E – Waste

General waste management

E1* Measures must be implemented so that waste is managed in accordance with the waste and resource management hierarchy and the waste and resource management principles.

E2* Waste, including waste fluids, but excluding waste used in closed-loop systems, must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by conditions (E3), (E5), (E6), (C7), (C9) and (C15) to be disposed of or used on site.

E3* Unless otherwise authorised by the conditions of this EA to be released to land, Waste fluids, other than flare precipitant stored in flare pits, or residual drilling material, or drilling fluids stored in sumps, must be contained in either:

(a) an above ground container; or

(b) a structure which contains the wetting front.

E4* Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990*.

Residual Drilling Materials

E5* If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.

E6* Residual drilling material can only be disposed of on-site:

(a) by mix-bury-cover method if the residual drilling material meets the approved quality criteria; or

(b) if it is certified by a suitably qualified third party as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.

E7* Records must be kept to demonstrate compliance with condition (E5) and condition (E6).

Schedule F – Noise

F1* Notwithstanding condition (A16), emission of noise from the petroleum activity at levels less than those specified in Schedule F, Table 1 Noise nuisance limits are not considered to be environmental nuisance.

Schedule F, Table 1 Noise nuisance limits

Time period	Metric	Short term noise event	Medium term noise event	Long term noise event
7:00am 6:00pm	LAeq,adj,15 min	45 dBA	43 dBA	40 dBA
6:00pm 10:00pm	LAeq,adj,15 min	40 dBA	38 dBA	35 dBA
10:00pm 6:00am	LAeq,adj,15 min	28 dBA	28 dBA	28 dBA
	Max LpA,15 min	55 dBA	55 dBA	55 dBA
6:00am 7:00am	LAeq,adj,15 min	40 dBA	38 dBA	35 dBA

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

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

6:00pm - 10:00 pm: 30 dBA

10:00pm - 6:00 am: 25 dBA

6:00am - 7:00 am: 30 dBA

F2* If the noise subject to a valid 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 LAeq, 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 detectable	+ 2 to + 5 dBA

F3* Notwithstanding condition (F1), emission of any low frequency noise must not exceed either (F3(a)) and (F3(b)), or (F3(c)) and (F3(d)) 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 (Max LpZ, 15 min) noise levels is no greater than 15 dB.

F4* A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.

F5* Blasting operations must be designed to not exceed an airblast overpressure level of 120 dB (linear peak) at any time, when measured at or extrapolated to any sensitive place.

F6* Blasting operations must be designed to not exceed a ground-borne vibration peak particle velocity of 10mm/s at any time, when measured at or extrapolated to any sensitive place.

Schedule G – Air

Venting and flaring

G1* Unless venting is authorised under the *Petroleum and Gas (Production and Safety) Act 2004* or the *Petroleum Act 1923*, waste gas must be flared in a manner that complies with all of (G1(a)) and (G1(b)) and (G1(c)), or with (G1(d)):

(a) an automatic ignition system is used, and

(b) a flame is visible at all times while the waste gas is being flared, and

(c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or

(d) it uses an enclosed flare.

Schedule H – Regulated structures

Assessment of consequence category

H1 The consequence category of any structure must be assessed by a suitably qualified and experienced person in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933[1]) at the following times:

a) prior to the design and construction of the structure; or

b) prior to any change in its purpose or the nature of its stored contents.

H2 A consequence assessment report and certification must be prepared for each structure assessed and the report may include a consequence assessment for more than one structure.

H3 Certification must be provided by the suitably qualified and experienced person who undertook the assessment, in the form set out in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

Design and construction of a regulated structure

H4 All regulated structures must be designed by, and constructed[2] under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

H5 Construction of a regulated structure is prohibited unless:

a) the holder has submitted a consequence category assessment report and certification to the administering authority; and

b) certification for the design, design plan and the associated operating procedures has been certified by a suitably qualified and experienced person in compliance with the relevant condition of this authority.

[1] This is the publication number, which can be used as a search term to find the latest version of the publication at www.des.qld.gov.au.

[2] Certification of design and construction may be undertaken by different persons.

H6 Certification must be provided by the suitably qualified and experienced person who oversees the preparation of the design plan in the form set out in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933), and must be recorded in the Register of Regulated Structures.

H7 Regulated structures must:

a) be designed and constructed in compliance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933);

b) be designed and constructed with due consideration given to ensuring that the design integrity would not be compromised on account of:

i) floodwaters from entering the regulated dam from any watercourse or drainage line; and

ii) wall failure due to erosion by floodwaters arising from any watercourse or drainage line.

c) have the floor and sides of the dam designed and constructed to prevent or minimise the passage of the wetting front and any entrained contaminants through either the floor or sides of the dam during the operational life of the dam and for any period of decommissioning and rehabilitation of the dam.

H8 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

b) construction of the regulated structure is in accordance with the design plan.

Notification of affected persons

H9 All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure

a) prior to the operation of the new regulated structure; and

b) if the emergency action plan is amended, within 5 business days of it being amended.

Operation of a regulated structure

H10 Operation of a regulated structure is prohibited unless the holder has submitted to the administering authority in respect of regulated structure, all of the following:

a) one paper copy and one electronic copy of the design plan and certification of the 'design plan' in accordance with condition H5;

b) a set of 'as constructed' drawings and specifications;

c) certification of the 'as constructed drawings and specifications' in accordance with condition H8;

d) where the regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, a copy of the certified system design plan;

e) the requirements of this authority relating to the construction of the regulated structure have been met;

f) the holder has entered the details required under this authority, into a Register of Regulated Structures; and

g) there is a current operational plan for the regulated structure.

H11 Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in compliance with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.

Mandatory reporting level

H12 Conditions H13 to H16 inclusive only apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping'.

H13 The Mandatory Reporting Level (the MRL) must be marked on a regulated dam in such a way that during routine inspections of that dam, it is clearly observable.

H14 The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware, notify the administering authority when the level of the contents of a regulated dam reaches the MRL.

H15 The holder must, immediately on becoming aware that the MRL has been reached, act to prevent the occurrence of any unauthorised discharge from the regulated dam.

H16 The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

H17 The holder must assess the performance of each regulated dam or linked containment system over the preceding November to May period based on actual observations of the available storage in each regulated dam or linked containment system taken prior to 1 July of each year.

H18 By 1 November of each year, storage capacity must be available in each regulated dam (or network of linked containment systems with a shared DSA volume), to meet the Design Storage Allowance (DSA) volume for the dam (or network of linked containment systems).

H19 The holder must, as soon as practicable but within forty-eight (48) hours of becoming aware that the regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, notify the administering authority.

H20 The holder must, immediately on becoming aware that a regulated dam (or network of linked containment systems) will not have the available storage to meet the DSA volume on 1 November of any year, act to prevent the occurrence of any unauthorised discharge from the regulated dam or linked containment systems.

Annual inspection report

H21 Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.

H22 At each annual inspection, the condition and adequacy of all components of the regulated structure must be assessed and a suitably qualified and experienced person must prepare an annual inspection report containing details of the assessment and include a recommendations section, with any recommended actions to ensure the integrity of the regulated structure or a positive statement that no recommendations are required.

H23 The suitably qualified and experienced person who prepared the annual inspection report must certify the report in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

H24 The holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority:

a) The recommendations section of the annual inspection report; and

b) If applicable, any actions being taken in response to those recommendations; and

c) If, following receipt of the recommendations and (if applicable) recommended actions, the administering authority requests a copy of the annual inspection report from the holder, provide this to the administering authority within 10 business days11 of receipt of the request.

Transfer arrangements

H25 The holder must provide a copy of any reports, documentation and certifications prepared under this authority, including but not limited to any Register of Regulated Structures, consequence assessment, design plan and other supporting documentation, to a new holder on transfer of this authority.

Decommissioning and rehabilitation

H26 Regulated structures must not be abandoned but be either:

a) decommissioned and rehabilitated to achieve compliance with condition H27; or

b) be left in-situ for a use by the landholder provided that:

i) it no longer contains contaminants that will migrate into the environment; and

ii) it contains water of a quality that is demonstrated to be suitable for its intended use(s); and

c) the holder of the environmental authority and the landholder agree in writing that the;

i) dam will be used by the landholder following the cessation of the environmentally relevant activity(ies); and

ii) landholder is responsible for the dam, on and from an agreed date.

H27 Before surrendering this environmental authority the site must be rehabilitated to achieve a safe, stable, non-polluting landform and be suitable for the relevant final land use.

Register of Regulated Structures

H28 A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.

H29 The holder must provisionally enter the required information in the Register of Regulated Structures when a design plan for a regulated dam is submitted to the administering authority.

H30 The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition H10 has been achieved.

H31 The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.

H32 All entries in the Register of Regulated Structures must be approved by the chief executive officer for the holder of this authority, or their delegate, as being accurate and correct.

H33 The holder must, at the same time as providing the annual return, supply to the administering authority a copy of the records contained in the Register of Regulated Structures, in the electronic format required by the administering authority.

Schedule I – Well construction, maintenance and stimulation activities

Drilling activities

I1* Oil based or synthetic based drilling muds must not be used in the carrying out of the petroleum activity(ies).

I2* Drilling activities must not result in the connection of the target gas producing formation and another aquifer.

I3* 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

I4* Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the reporting limit.

I5* Stimulation activities must not negatively affect water quality, other than that within the stimulation impact zone of the target gas producing formation.

I6* Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.

I7* 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.

I8* 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

I9* Prior to undertaking well stimulation activities, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.

I10* The stimulation risk assessment 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

I11* Prior to undertaking any stimulation 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 within a two (2) kilometre horizontal radius from the location of the stimulation 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 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 (I9) and (I10).

I12* Prior to undertaking stimulation activities at a well, there 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 (I13).

I13* Baseline bore and well assessments must include relevant analytes and physicochemical 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 [µS/m]

(c) turbidity [NTU]

(d) total dissolved solids [mg/L]

(e) temperature [°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 CaCO3) [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, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [µg/L]

(m) total petroleum hydrocarbons [µg/L]

(n) BTEX (as benzene, toluene, ethylbenzene, ortho-xylene, para- and meta-xylene, and total xylene) [µg/L]

(o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [µg/L]

(p) sodium hypochlorite [mg/L]

(q) sodium hydroxide [mg/L]

(r) formaldehyde [mg/L]

(s) ethanol [mg/L]; and

(t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].

Stimulation Impact Monitoring Program

I14* 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 (I9) and (I10) 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 per cent of the volume used in stimulation activities has been extracted from the stimulated well; and

(d) all bores in accordance with condition (I11) 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 (I13) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.

I15* 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 (I13); 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.

I16* The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholders upon request by that landholder.

Schedule J – Rehabilitation

Rehabilitation Planning

J1* A Rehabilitation Plan must be developed by a suitably qualified person and must include the:

(a) rehabilitation goals; and

(b) procedures to be undertaken for rehabilitation that will:

(i) achieve the requirements of conditions (J2) to (J10) inclusive; and

(ii) provide for appropriate monitoring and maintenance.

Rehabilitation reporting for relinquishment of part of an authority to prospect area under the Petroleum and Gas (Production and Safety) Act 2004

J2* Prior to relinquishing all or part of an authority to prospect area, a rehabilitation report must be prepared which specifically relates to the area to be relinquished and demonstrates conditions (J9) and (J10) have been met.

J3* The report required under condition (J2) must be submitted to the administering authority at least 40 business days prior to the relinquishment notice being lodged with the administering authority for the Petroleum and Gas (Production and Safety) Act 2004.

Transitional Rehabilitation

J4* Significantly disturbed areas that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria:

(a) contaminated land resulting from petroleum activities is remediated and rehabilitated;

(b) the areas are:

(i) non-polluting;

(ii) a stable landform;

(iii) re-profiled to contours consistent with the surrounding landform

(c) surface drainage lines are re-established;

(d) top soil is reinstated; and

(e) either:

(i) groundcover, that is not a prohibited or restricted pest species, is growing; or

(ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Remaining Dams

J5* Where there is a dam, (including a low consequence dam) that is being or intended to be used by the landholder or overlapping tenure holder, the dam must be decommissioned to no longer accept inflow from the petroleum activity(ies) and the contained water must be of a quality suitable for the intended on-going uses(s) by the landholder or overlapping tenure holder.

Pipeline Activities

J6* Pipeline trenches must be backfilled and topsoils reinstated within three months after pipe laying.

J7* Reinstatement and revegetation of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.

J8* Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:

(a) a stable landform

(b) re-profiled to a level consistent with surrounding soils

(c) re-profiled to original contours and established drainage lines; and

(d) vegetated with groundcover which is not a prohibited or restricted pest species, and which is established and growing.

Final Rehabilitation Acceptance Criteria

J9* All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following

final acceptance criteria measured either against the highest ecological value adjacent land use or the pre-disturbed land use:

(a) greater than or equal to 70 per cent of native ground cover species richness

(b) greater than or equal to the total per cent ground cover

(c) less than or equal to the per cent species richness of prohibited or restricted pest species

(d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then:

(i) at least one Regional Ecosystem(s) from the same broad vegetation group, as demonstrated by the predominant species in the ecologically dominant layer, must be present; and,

(ii) the Regional Ecosystem present in (J9)(d)(i) must possess an equivalent or higher conservation value (biodiversity status) than the Regional Ecosystem(s) in either the adjacent land or pre-disturbed land.

Final Rehabilitation Acceptance Criteria in Environmentally Sensitive Areas

J10* Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (J1) and (J2)) must be met:

(a) greater than or equal to 70% of native ground cover species richness

(b) greater than or equal to the total per cent ground cover

(c) less than or equal to the per cent species richness of prohibited or restricted pest species

(d) greater than or equal to 50% of organic litter cover

(e) greater than or equal to 50% of total density of coarse woody material; and

(f) all predominant species in the ecologically dominant layer, that define the pre-disturbance regional ecosystem(s) are present.

Schedule K – Notification

K1* The administering authority must be notified through the Pollution Hotline 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;

(vii) 100,000 L of irrigation-quality coal seam gas water, released inside a designated irrigation area authorised by condition (C9)(c).

(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; or

(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.

K2* The notification of emergencies or incidents as required by condition (K1) 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 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.

K3* Within 10 business days following the initial notification under conditions (K1) and (K2) 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.

Schedule L – 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.

"adjacent land use(s)" means the ecosystem function adjacent to an area of significant disturbance, or where there is no ecosystem function, the use of the land. An adjacent land use does not include an adjacent area that shows evidence of edge effect.

"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.

"affected person" is someone whose drinking water can potentially be impacted as a result of discharges from a dam or their life or property can be put at risk due to dwellings or workplaces being in the path of a dam break flood.

"aggregated 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 about the way in which a particular environmental nuisance impact will be dealt with at a sensitive place, and may include an agreed period of time for which the arrangement is in place. An alternative arrangement may include, but is not limited to, a range of nuisance abatement measures to be installed at the sensitive place, or provision of alternative accommodation for the duration of the relevant 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, vegetation community attributes 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.

"analytes" means a chemical parameter determined by either physical measurement in the field or by laboratory analysis.

"annual exceedance probability or AEP" the probability that at least one event in excess of a particular magnitude will occur in any given year.

"annual inspection report" means an assessment prepared by a suitably qualified and experienced person containing details of the assessment against the most recent consequence assessment report and design plan (or system design plan):

(a) against recommendations contained in previous annual inspections reports;

(b) against recognised dam safety deficiency indicators;

(c) for changes in circumstances potentially leading to a change in consequence category;

(d) for conformance with the conditions of this authority;

(e) for conformance with the 'as constructed' drawings;

(f) for the adequacy of the available storage in each regulated dam, based on an actual observation or observations 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 (or network of linked containment systems);

(g) for evidence of conformance with the current operational plan.

"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.

"approved quality criteria" for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards:

Part A In all cases:

Parameter	Maximum concentration
pH	6-10.5 (range)
Electrical Conductivity	20 dS/m (20,000 µS/cm)
Chloride*	8000 mg/L

*Chloride analysis is only required if an additive containing chloride was used in the drilling process.

The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing.

Part B If any of the following metals are a component of the drilling fluids, then for that metal:

Parameter	Maximum concentration
Arsenic	20 mg/kg
Selenium	5 mg/kg
Boron	100 mg/kg
Cadmuim	3 mg/kg
Chromium	400 mg/kg
Copper	100 mg/kg
Lead	600 mg/kg

The limits in Part B and Part C refer to the post soil/by-product mix. Part C If a hydrocarbon sheen is visible, the following hydrocarbon fractions:

TPH	Maximum concentration
C6 – C10	170 mg/kg
C10 – C16	150 mg/kg
C16 – C34	1300 mg/kg
C34 – C40	5600 mg/kg
Total Polycyclic Aromatic Hydrocarbons (PAHs)	20 mg/kg
Phenols (halogenated)	1 mg/kg
Phenols (non-halogenated)	60 mg/kg
Monocyclic aromatic hydrocarbons (Total sum of benzene, toluene, ethyl benzene, xylenes including otho, para and meta xylenes) and styrene)	7 mg/kg

TPH	Maximum concentration
Benzene	1 mg/kg

"areas of pre-existing 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.

"assessed or assessment" by a suitably qualified and experienced person in relation to a consequence 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 of the assessment:

(a) exactly what has been assessed and the precise nature of that determination;

(b) the relevant legislative, regulatory and technical criteria on which the assessment has been based;

(c) 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

(d) the reasoning on which the assessment has been based using the relevant data and facts, and the relevant criteria.

"associated water" means underground water taken or interfered with, if the taking or interference happens during the course of, or results from, the carrying out of another authorised activity under a petroleum authority, such as a petroleum well, and includes waters also known as produced formation water. The term includes all contaminants suspended or dissolved within the water.

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

(a) operations of any kind and all things constructed, erected or installed for that dam; and

(b) 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 3580" means any of the following publications:

- AS3580.10.1 Methods for sampling and analysis of ambient air - Determination of particulate matter - Deposited matter - Gravimetric method.
- AS3580.9.6 Methods for sampling and analysis of ambient air Determination of suspended particulate matter PM10 high volume sampler with size-selective inlet Gravimetric method
- AS3580.9.9 Methods for sampling and analysis of ambient air Determination of suspended particulate matter PM10 low volume sampler Gravimetric sampler.

"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.

"authorised resource activities" for this environmental authority means the resource activities authorised to be carried out under condition (A1).

"authority" means an environmental authority.

"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 per cent 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.

"being or intended to be utilised by the landholder or overlapping tenure holder" for significantly disturbed land, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use of the land such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

"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.

For dams, means there is a written agreement (e.g. land and compensation agreement) between the landholder or the overlapping tenure holder and the holder of the environmental authority identifying that the landholder or the overlapping tenure holder has a preferred use for the dam such that rehabilitation standards for revegetation by the holder of the environmental authority are not required.

"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.

"bund or bunded" 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 bunded 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.

"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
- 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.

"BTEX" means benzene, toluene, ethylbenzene, ortho-xylene, paraxylene, meta-xylene and total xylene.

"Category A Environmentally Sensitive Area" means any area listed in Schedule 19, part 1, section 1 of the Environmental Protection Regulation 2008.

"Category B Environmentally Sensitive Area" means any area listed in Schedule 19, 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;
- Regional parks (resource use area) under the Nature Conservation Act 1992;
- An area validated as "Essential Habitat" from ground-truthing surveys in accordance with the Vegetation Management Act 1999 for a species of wildlife listed as endangered or vulnerable under the Nature Conservation Act 1992;
- Of Concern Regional Ecosystems that are remnant vegetation identified in the database called 'RE description database' containing Regional Ecosystem numbers and descriptions.

"certifying or certify or certified or certification" in relation to a dam, means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by this Manual, including design plans, 'as constructed' drawings and specifications, construction, operation or an annual report regarding regulated structures, undertaken in accordance with the Board of Professional Engineers of Queensland Policy Certification by RPEQs (ID: 1.4 (2A))

"certifying or certify or certified or certification" in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating:

- The person's qualifications and experience relevant to the function;
- that the person has not knowingly included false, misleading or incomplete information in the document;
- that the person has not knowingly failed to reveal any relevant information or document to the administering authority;
- that the document addresses the relevant matters for the function and is factually correct; and
- that the opinions expressed in the document are honestly and reasonably held.

"clearing" for vegetation:

(a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but

(b) does not include destroying standing vegetation by stock, or lopping a tree.

"closed-loop systems" means using waste on site in a way that does not release waste or contaminants in the waste to the environment.

"coal seam gas water" means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.

"coal seam gas water concentrate" means the concentrated saline water waste stream from a reverse osmosis 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 a impoundment, enclosure or structure that is designed to be used to hold coal seam gas water for evaporation.

"commercial species" means species as listed in parts 1, 2 and 3 of Schedule 6 of the Vegetation Management Regulation 2012, which are above the diameters / sizes specified in this Schedule for each listed species.

"construction or constructed" 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 purpose of preparing a design plan.

"consequence" in relation to a structure as defined, means the potential for environmental harm resulting from the collapse or failure of the structure to perform its primary purpose of containing, diverting or controlling flowable substances.

"consequence category" means a category, either low, significant or high, into which a dam is assessed as a result of the application of tables and other criteria in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

"control measure" has the meaning in section 47 of the Environmental Protection Regulation 2008 and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.

"daily peak design capacity" for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the Environmental Protection Regulation 2008 as the higher equivalent person (EP) for the works calculated using each of the formulae found in the definition for EP.

"dam" means a land-based structure or a void that 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 (liquids and/or solids) 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 (for example, via spillway).

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

"design plan" is a document setting out how all identified consequence scenarios are addressed in the planned design and operation of a regulated structure.

"design storage allowance or DSA" means an available volume, estimated in accordance with the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority, must be provided in a dam as at 1 November each year in order to prevent a discharge from that dam to an annual exceedance probability (AEP) specified in that Manual.

"discharge area" means:

- that part of the land surface where groundwater discharge produces a net movement of water out of the groundwater; and
- identified by an assessment process consistent with the document Salinity Management Handbook Queensland Department of Natural Resources, 1997, as amended from time to time; or
- identified by an approved salinity hazard map held by the Department of Environment and Heritage Protection.

"document" has the meaning in the 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).

"ecologically dominant layer" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means the layer making the greatest contribution to the overall biomass of the site and the vegetation community (NLWRA 2001). This is also referred to as the ecologically dominant stratum or the predominant canopy in woody ecosystems.

"ecosystem function" means the interactions between and within living and nonliving components of an ecosystem and generally correlates with the size, shape and location of the vegetation community.

"emergency action plan" means documentation forming part of the operational plan held by the holder or a nominated responsible officer, that identifies emergency conditions that sets out procedures and actions that will be followed and taken by the dam owner and operating personnel in the event of an emergency. The actions are to minimise the risk and consequences of failure, and ensure timely warning to affected persons and the implementation of protection measures. The plan must require dam owners to annually review and update contact information where required.

"enclosed flare" means a device where the residual gas is burned in a cylindrical or rectilinear enclosure that includes a burning system and a damper where air for the combustion reaction is admitted.

"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 activities, the time at which the petroleum authority ends or the time that the land in question ceases to be part of an authority.

"environmental harm" has the meaning in section 14 of the Environmental Protection Act 1994 and means any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.

Environmental harm may be caused by an activity

(a) whether the harm is a direct or indirect result of the activity; or

(b) whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

"environmental nuisance" has the meaning in section 15 of the Environmental Protection Act 1994 and means unreasonable interference or likely interference with an environmental value caused by

(a) aerosols, fumes, light, noise, odour, particles or smoke; or

(b) an unhealthy, offensive or unsightly condition because of contamination; or

(c) another way prescribed by regulation.

"equivalent person" or "EP" has the meaning under section 3 of the Planning Guidelines For Water Supply and Sewerage, 2005, published by the Queensland Government. It is calculated in accordance with Schedule 2, Section 63(4) of the Environmental Protection Regulation 2008 where:

- EP = V/200 where V is the volume, in litres, of the average dry weather flow of sewage that can be treated at the works in a day; or
- EP = M/2.5 where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.

"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 7 April 2012.

"existing low hazard dam" means a low hazard dam that was constructed and/or whose construction had substantially commenced on 7 April 2012.

"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.

"Extreme Storm Storage" means a storm storage allowance determined in accordance with the criteria in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority.

"existing structure" means a structure that prior to the activation of the GFD conditions meets any or both of the following, a structure:

(a) with a design that is in accordance with the April 2019 version 9.00 Manual for Assessing Consequence Categories and Hydraulic Performance of Structures and that is considerably in progress;

(b) that is under considerable construction or that is constructed.

"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 or wetland including a bridge, road, causeway, pipeline, rock revetment, drain outlet works, erosion prevention structure or fence.

"flare pit" has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933), and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.

"flare precipitant" means waste fluids which result from the operation of a flare.

"floodplains" 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 of 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.

"fuel burning or combustion facility" means a permanent fuel burning or combustion equipment which in isolation, or combined in operation, or which are interconnected, is, or are capable of burning more than 500 kg of fuel in an hour.

"GDA" means Geocentric Datum of Australia.

"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 "wetland of other environmental value" on the map of referable wetlands.

"Great Artesian Basin (GAB) spring" means an area protected under the Environment Protection and Biodiversity Conservation Act 1999 because it is considered to be a Matter of National Environmental Significance and identified as a:

- community of native species dependent on natural discharge of groundwater from the Great Artesian Basin; or

- Great Artesian Basin spring; or
- Great Artesian Basin discharge spring wetland.

A GAB spring includes a spring vent, spring complex or watercourse spring and includes the land to which water rises naturally from below the ground and the land over which the water then flows.

Note: The Australian Government's Protected Matters Search Tool should be used to get an indication of whether the area of interest may contain an MNES spring.

Note: The GAB springs dataset can be requested from the Queensland Government Herbarium

"greywater" means wastewater generated from domestic activities such as laundry, dishwashing, and bathing. Greywater does not include sewage.

"groundwater dependent ecosystems (GDE)" means ecosystems which require access to groundwater on a permanent or intermittent basis to meet all or some of their water requirements so as to maintain their communities of plants and animals, ecological processes and ecosystem services. For the purposes of the environmental authority, groundwater dependent ecosystems do not include those mapped as "unknown".

"growing" means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.

"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
- is shown on a regrowth vegetation map.

"holder" means any person who is the holder of, or is acting under, that environmental authority.

"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 the design criteria specified for the relevant consequence category in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

"hydraulic testing" means the testing of a geological formation to evaluate the hydrogeological characteristics of the formation.

"impulsive (for noise)" means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.

"incidental activity" for this environmental authority means an activity that is not a specified relevant activity and is necessary to carry out the activities listed in Schedule A, Table 1 – Scale and Intensity for the Activities.

"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.

"LA 90, adj, 15mins" 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.

"LAeq, adj, 15mins" 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.

"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.

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

"landholders' active groundwater bores" 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.

"limited impact camp" mean accommodation camps that:

- are temporary (no more than 6 months);
- are located within pre-existing areas of clearing or significant disturbance;
- are up to 2 ha or located within well sites; and
- may involve sewage treatment works that are no release works or release works that involve an irrigation release within pre-existing areas of clearing or significant disturbance.

"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 onsite which contains soluble, suspended or miscible contaminants likely to have been derived from the said material.

"levee" means an embankment that only provides for the containment and diversion of stormwater or flood flows from a contributing catchment, or containment and diversion of flowable materials resulting from releases from other works, during the progress of those stormwater or flood flows or those releases; and does not store any significant volume of water or flowable substances at any other times.

"limited impact petroleum activities" means petroleum activities that are located within areas that are not a regional ecosystem and:

- are single well sites (includes observation, pilot, injection and production wells) greater than 1.25 ha; or

- are multi-well sites greater than 3 ha; and
- may involve 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; and
- may involve upgrading or maintenance of existing roads or tracks; and
- may include power and communication lines; and
- may include gas gathering lines from a well site to the initial compression facility; and
- may include water gathering lines from a well site to the initial water storage or dam.

"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, pipelines, flowlines, roads and access tracks.

"long term noise event" means 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 consequence dam" means any dam that is not a high or significant consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933).

"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)

"mandatory reporting level or MRL" means a warning and reporting level determined in accordance with the criteria in the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority.

"manual" in reference to dams means the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority, as amended from time to time.

"map of referrable wetlands" has the meaning in Schedule 12 of the Environmental Protection executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D.

"Max LpA, 15 min" means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

"Max LpZ, 15 min" means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.

"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.

"methodology" means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.

"mix-bury-cover method" means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology:

- the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material (kw=10 8m/s) or subsoil with a clay content of greater than 20%; and
- the residual solids is mixed with subsoil in the sump and cover; and the subsoil and residual solids is mixed at least three parts subsoil to one part waste (v/v); and
- a minimum of one metre of clean subsoil must be placed over the subsoil and residual solids mixture; and
- topsoil is replaced.

"month" has the meaning in the 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.

"operational plan" includes:

(a) normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA);

(b) contingency and emergency action 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 regulated structure.

"oil based drilling" 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) = p0 +g ∫0 ≈ p(z) dz where p(z) is the density of the overlying rock at depth z and g is the acceleration due to gravity. p0 is the datum pressure, like the pressure at the surface.

"permanent sewage treatment plant operations" means a 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.

"pipeline waste water" means hydrostatic testing water, flush water or water from low point drains.

"pre-disturbed land use" means the function or use of the land as documented prior to significant disturbance occurring at that location.

"predominant species" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a species that contributes most to the overall above-ground biomass of a particular stratum.

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

"produced water" has the meaning in Section 15A of the Petroleum and Gas (Production and Safety) Act 2004 and means CSG water or associated water for a petroleum tenure.

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

"prohibited or restricted pest species" means any pest that is:

(a) a plant or animal, other than a native species of plant or animal, that is

(i) invasive biosecurity matter under the *Biosecurity Act 2014* (Qld); or

Notes— 1 See the Biosecurity Act 2014*, schedule 1, part 3 or 4 or schedule 2, part 2; and*

2 See the note to the Biosecurity Act 2014*, schedules 1 and 2.*

(ii) controlled biosecurity matter or regulated biosecurity matter under the *Biosecurity Act 2014* (Qld)

(iii) tramp ants listed in schedule 1 and schedule 2 of the *Biosecurity Act 2014* (Qld)

(b) a pest declared under a local law by the local government for the Land to be a pest because the pest is causing, or has the potential to cause, an adverse environmental, economic or social impact in all or part of the local government area.

"register of regulated structures" includes:

(a) Date of entry in the register;

(b) Name of the structure, its purpose and intended/actual contents;

(c) The consequence category of the dam as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933);

(d) Dates, names, and reference for the design plan plus dates, names, and reference numbers of all document(s) lodged as part of a design plan for the dam;

(e) Name and qualifications of the suitably qualified and experienced person who certified the design plan and 'as constructed' drawings;

(f) For the regulated dam, other than in relation to any levees –

i. The dimensions (metres) and surface area (hectares) of the dam measured at the footprint of the dam;

ii. Coordinates (latitude and longitude in GDA94) within five metres at any point from the outside of the dam including its storage area

iii. Dam crest volume (megalitres);

iv. Spillway crest level (metres AHD).

v. Maximum operating level (metres AHD);

vi. Storage rating table of stored volume versus level (metres AHD);

vii. Design storage allowance (megalitres) and associated level of the dam (metres AHD);

viii. Mandatory reporting level (metres AHD);

(g) The design plan title and reference relevant to the dam;

(h) The date construction was certified as compliant with the design plan;

(i) The name and details of the suitably qualified and experienced person who certified that the constructed dam was compliant with the design plan;

(j) Details of the composition and construction of any liner;

(k) The system for the detection of any leakage through the floor and sides of the dam;

(l) Dates when the regulated dam underwent an annual inspection for structural and operational adequacy, and to ascertain the available storage volume for 1 November of any year;

(m) Dates when recommendations and actions arising from the annual inspection were provided to the administering authority;

(n) Dam water quality as obtained from any monitoring required under this authority as at 1 November of each year.

"regional ecosystem(s)" has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a vegetation community in a bioregion that is consistently associated with a particular combination geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystems Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.

"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 20AI of the Vegetation Management Act 1999 to show on the map as high value regrowth vegetation.

"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 structure in the significant or high consequence category as assessed using the Manual for assessing consequence categories and hydraulic performance of structures (ESR/2016/1933) published by the administering authority. A regulated structure does not include:

- 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;
- a sump or earthen pit used to store residual drilling material and drilling fluid only for the duration of drilling and well completion activities;
- a flare pit.

"rehabilitation or rehabilitated" means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.

"reinstate or reinstatement" for pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the APGA Code of Environmental Practice: Onshore Pipelines Revision 4 (2017).

"remnant unit" means a continuous polygon of remnant vegetation (as defined by the Queensland Herbarium) representative of a single RE type or a single heterogeneous unit.

"remnant vegetation" means vegetation, part of which forms the predominant canopy of the vegetation:

- covering more than 50 per cent of the undisturbed predominant canopy; and

- averaging more than 70 per cent 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 quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L 0.02 ug/L.

"residual drilling material" means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.

"resource activity(ies)" has the meaning in section 107(d) of the Environmental Protection Act 1994.

"restoration" means the replacement of structural habitat complexity, ecosystems processes, services and function from a disturbed or degraded site to that of a pre-determined or analogue site. For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.

"restricted stimulation fluids" has the meaning in section 206 of the Environmental Protection Act 1994 and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation:

(a) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene

(b) chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

"revegetation or revegetating or revegetate" means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.

"secondary protection zone" in relation to a Category A or Category B Environmentally Sensitive Area means an area within 100 metres from the boundary of the 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);
- a library, childcare centre, kindergarten, school, university or other educational institution;
- a medical centre, surgery or hospital;

- a protected area;
- 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;
- 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; and
- for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.

"sensitive receptor" is defined in Schedule 2 of the Environmental Protection (Noise) Policy 2008, and means an area or place where noise is measured.

"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 or significant disturbance or significant disturbance to land or areas" has the meaning in Schedule 12, section 4 of the Environmental Protection Regulation 2008. Land is significantly disturbed if:

(a) it is contaminated land; or

(b) it has been disturbed and human intervention is needed to rehabilitate it

  (i) to a condition required under the relevant environmental authority; or

  (ii) if the environmental authority does not require the land to be rehabilitated to a particular condition to the condition it was in immediately before the disturbance.

"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" for this environmental activity means an activity that:

(a) but for being carried out as a resource activity, would otherwise be an activity prescribed under section 19 of the Environmental Protection Act 1994 as an environmentally relevant activity; or

(b) stimulation activities; or

(c) extracting material other than by dredging

"spillway" means a weir, channel, conduit, tunnel, gate or other structure designed to permit discharges form the dam, normally under flood conditions or in anticipation of flood conditions.

"stable" has the meaning in Schedule 5 of the Environmental Protection Regulation 2008 and, for a site, means the rehabilitation and restoration of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.

"stimulation" means a technique used to increase the permeability of a natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. In includes hydraulic fracturing / hydro-fraccing, fracture acidizing and the use of proppant treatments.

"stimulation fluid" means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.

"stimulation impact zone" means a 100m maximum radial distance from the stimulation target location within a gas producing formation.

"structure" for the purposes of Schedule H means a dam or levee.

"suitably qualified person" means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis to performance relative to the subject matters 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.

"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.

"suitably qualified third party" means a person who:

(a) has qualifications and experience relevant to performing the function including but not limited to:

  i. a bachelor's degree in science or engineering; and

  ii. 3 years experience in undertaking soil contamination assessments; and

(b) is a member of at least one organisation prescribed in Schedule 8 of the Environmental Protection Regulation 2008; and

(c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.

"sump" means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.

"synthetic based drill 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.

"system design plan" means a plan that manages an integrated containment system that shares the required DSA and/or ESS volume across the integrated containment system.

"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).

"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 300mm in depth from the natural surface.

"total density of coarse woody material" means the total length of logs on the ground greater than or equal to 10cm diameter per hectare and number of logs on the ground greater than or equal to 10cm diameter per hectare.

"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.

"valid complaint" means all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.

"visible salt" means where salt crystals accumulate on the soil surface.

"void" means any constructed, open excavation in the ground.

"waste and resource management hierarchy" has the meaning provided in section 9 of the Waste Reduction and Recycling Act 2011 and is the following precepts, listed in the preferred order in which waste and resource management options should be considered:

(a) AVOID unnecessary resource consumption;

(b) REDUCE waste generation and disposal

(c) RE-USE waste resources without further manufacturing

(d) RECYCLE waste resources to make the same or different products

(e) RECOVER waste resources, including the recovery of energy

(f) TREAT waste before disposal, including reducing the hazardous nature of waste

(g) DISPOSE of waste only if there is no viable alternative.

"waste and resource management principles" has the meaning provided in section 4(2)(b) of the *Waste Reduction and Recycling Act 2011* and means the:

(a) polluter pays principle

(b) user pays principle

(c) proximity principle

(d) product stewardship principle.

"waste fluids" has the meaning in section 13 of the Environmental Protection Act 1994 in conjunction with the common meaning of "fluid" which is "a substance which is capable of flowing and offers no permanent resistance to changes of shape". Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.

"watercourse" has the meaning in Schedule 4 of the Environmental Protection Act 1994 and means:

1) a river, creek or stream in which water flows permanently or intermittently

   (a) in a natural channel, whether artificially improved or not; or

   (b) in an artificial channel that has changed the course of the watercourse.

2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.

"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.

"water year" means the 12-month period from 1 July to 30 June.

"wet season" means the time of year, covering one or more months, when most of the average annual rainfall in a region occurs. For the purposes of DSA determination this time of year is deemed to extend from 1 November in one year to 31 May in the following year inclusive.

"well integrity" means the ability of a well to contain the substances flowing through it.

"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, wetland 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
- areas defined under the Queensland Wetlands Program as 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.

    The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a Great Artesian Basin Spring or a subterranean wetland that is a cave or aquifer.

"wetland of high ecological significance" otherwise known as "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.

END OF PART B OF THIS ENVIRONMENTAL AUTHORITY