

Permit

Environmental Protection Act 1994

Environmental authority EPPG03516115

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

Environmental authority number: EPPG03516115

Environmental authority takes effect on 23 May 2017.

The anniversary date of this environmental authority is 03 March each year. The payment of the annual fee will be due each year on this day.

Environmental authority holder(s)

Name(s)	Registered address
PZE (SURAT) PTY LTD	Tower A, Suite 1302, Level 13 821 Pacific Highway CHATSWOOD NSW 2067
Armour Energy (Surat Basin) Pty Ltd	Level 27 111 Eagle Street BRISBANE CITY QLD 4000

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL28
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL69
Schedule 3 - 06 - A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL89

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 *Planning Act 2016* or an SDA Approval under the *State Development and Public Works Organisation Act 1971*), this EA will not take effect until the additional authorisation has taken effect.

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.

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

Enquiries:
Energy and Extractive Resources
Department of Environment and Science
Phone: 3330 5715
Email: EnergyandExtractive@des.qld.gov.au

Privacy statement

Pursuant to section 540 of the EP Act, the Department is required to maintain a register of certain documents and information authorised under the EP Act. A copy of this document will be kept on the public register. The register is available for inspection by members of the public who are able to take extracts, or copies of the documents from the register. Documents that are required to be kept on the register are published in their entirety, unless alteration is required by the EP Act. There is no general discretion allowing the Department to withhold documents or information required to be kept on the public register. For more information on the Department's public register, search 'public register' at www.qld.gov.au. For queries about privacy matters please email privacy@des.qld.gov.au or telephone 13 74 68.

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

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1 SCHEDULE A – GENERAL CONDITIONS

- (A1) This environmental authority authorises the carrying out of the following resource activities:
- (a) The following petroleum activities:
 - (i) petroleum exploration, appraisal and development wells;
 - (ii) low consequence dams; and
 - (iii) regulated structures.
 - (b) The following specified relevant activities:
 - (i) stimulation activities;
 - (ii) extracting, other than by dredging; and
 - (c) Incidental activities that are not otherwise specified relevant activities.
- (A2) The activities in condition (A1) are authorised subject to the conditions of this environmental authority.
- (A3) This environmental authority does not authorise a relevant act¹ to occur in carrying out an authorised resource activity unless a condition of this environmental authority expressly authorises the relevant act to occur². Where there is no condition, the lack of a condition must not be construed as authorising the relevant act.

Third Party Audit

- (A4) A third party auditor must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.
- (A5) Notwithstanding condition (A4), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.
- (A6) An audit report must be prepared and certified by the third party auditor presenting the findings of each audit carried out.
- (A7) 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.
- (A8) 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.

Monitoring Standards

- (A9) All monitoring must be undertaken by a suitably qualified person.
- (A10) If requested by the administering authority in relation to investigating a complaint, monitoring must be commenced within 10 business days.

¹ See section 493A of the *Environmental Protection Act 1994*

² Section 493A(2) of the *Environmental Protection Act 1994* provides that a relevant act is unlawful unless it is authorised to be done under, among other things, an environmental authority.

- (A11) All laboratory analyses and tests must be undertaken by a laboratory that has NATA accreditation for such analyses and tests, unless NATA accredited tests are not available.
- (A12) 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 3580.

Notification

- (A13) In addition to the requirements under Chapter 7, Part 1, Division 2 of the *Environmental Protection Act 1994*, the administering authority must be notified through the Pollution Hotline and in writing, as soon as possible, but within 48 hours of becoming aware of any of the following events:
- (a) any unauthorised significant disturbance to land
 - (b) potential or actual loss of structural or hydraulic integrity of a dam
 - (c) when the level of the contents of any regulated dam reaches the mandatory reporting level
 - (d) when a regulated dam (or network of linked containment systems) will not have available storage to meet the design storage allowance on 1 November of any year
 - (e) potential or actual loss of well integrity
 - (f) when the seepage trigger action response procedure required under condition (C3) (g)) is or should be implemented
 - (g) unauthorised releases of any volume of prescribed contaminants to waters
 - (h) unauthorised releases of volumes of contaminants, in any mixture, to land greater than:
 - (i) 200 L of hydrocarbons; or
 - (ii) 200 L of stimulation additives; or
 - (iii) 500 L of stimulation fluids; or
 - (iv) 1 000 L of brine; or
 - (v) 5 000 L of associated water; or
 - (vi) 5 000 L of raw sewage; or
 - (vii) 10 000 L of treated sewage effluent
 - (viii) the use of restricted stimulation fluids
 - (i) groundwater monitoring results from a landholder's active groundwater bore monitored under the stimulation impact monitoring program which is a 10% or greater increase from a previous baseline value for that bore and which renders the water unfit for its intended use
 - (j) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.

Contingency procedures for emergency environmental incidents

- (A14) By 17 May 2017, the EA holder must have developed 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

- (A15) All plant and equipment must be maintained and operated in their proper and effective condition.
- (A16) 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
 - (b) exploration, appraisal and development wells;
 - (c) water treatment facilities;
 - (d) field compressor stations;
 - (e) central compressor stations;
 - (f) gas processing facilities; and
 - (g) pipeline compressor stations.
- (A17) Notwithstanding (A16), infrastructure listed in condition (A16) in existence prior to 17 November 2016, must be signed with a unique reference name or number in such a way that it is clearly observable by 17 November 2017.
- (A18) Condition (A19) does not apply to the petroleum activity(ies) which commenced prior to 17 November 2016.
- (A19) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Erosion and sediment control

- (A20) 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) allow stormwater to be diverted around or 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).

Complaints

- (A21) Petroleum activities must not cause environmental nuisance at a sensitive place, other than where an alternative arrangement is in place.

Documentation

- (A22) 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.
- (A23) All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
- (A24) All documents required to be developed under this environmental authority must be kept for five years.
- (A25) 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.
- (A26) A record of all complaints must be kept including the date, complainant's details, source, reason for the complaint, description of investigations and actions undertaken in resolving the complaint.

Financial assurance transitional conditions

- (A27) By 30 September 2016, the EA holder must submit to the administering authority financial assurance calculations in accordance with the current Guideline - Financial assurance under the *Environmental Protection Act 1994* to be assessed by the administering authority. The financial assurance calculations must include all existing petroleum activities that have caused significant disturbance to land.
- (A28) The EA holder must provide the administering authority the amount of financial assurance stated on a statutory notice in the form of a bank guarantee by date stated on the statutory notice.

Financial assurance

- (A29) Prior to any changes in petroleum activities which would result in an increase to the maximum significant disturbance since financial assurance was last given to the administering authority, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance.
- (A30) If the amount of financial assurance held by the administering authority has been discounted and either the nominated period of financial assurance has ended, or an event or change in circumstance has resulted in the holder of the environmental authority no longer being able to meet one or more of the mandatory pre-requisites or applicable discount criteria, the holder of the environmental authority must amend the financial assurance and give the administering authority the increased amount of financial assurance as soon as practicable.

2 SCHEDULE B – WATER

Contaminant release

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

Existing petroleum activities

- (B2) Conditions (B3), (B4), (B6), (B7) and (B8) in *Schedule B – Water* do not apply to the petroleum activity(ies) which commenced prior to 17 November 2016.
- (B3) Petroleum activities must not occur within 200m of a:
- (a) Great Artesian Basin (GAB) Spring
 - (b) Subterranean cave GDE
- (B4) Only linear infrastructure is permitted in a watercourse.
- (B5) All reasonable alternative locations must be considered prior to the construction of any linear infrastructure that will result in significant disturbance in or on the bed and banks of a watercourse.
- (B6) The construction or maintenance of linear infrastructure activities in a watercourse must be conducted in the following preferential order:
- (a) firstly, in times where there is no water present;
 - (b) secondly, in times of no flow; and
 - (c) thirdly, conducting works in times of flow but in a way that does not impede low flow.
- (B7) Only essential petroleum activities (excluding temporary campsites/workforce accommodation) are permitted within a wetland of high ecological significance.
- (B8) Only essential petroleum activities are permitted within a wetland of general ecological significance.
- (B9) Prior to carrying out essential petroleum activities within a general ecologically significant wetland or wetland of high ecological significance it must be demonstrated, in the following order of preference that:
- (a) no reasonable or practicable alternative exists for carrying out the essential petroleum activities within the general ecologically significant wetland or wetland of high ecological significance;
 - (b) the essential petroleum activities are preferentially located in pre-existing areas of clearing or significant disturbance.
- (B10) Petroleum activities other than construction and maintenance activities carried out within any general ecologically significant wetland or wetland of high ecological significance must not:
- (a) change the existing surface water hydrological regime; or
 - (b) impact bank stability.
- (B11) Construction or maintenance of petroleum activities in a general ecologically significant wetland or a wetland of high ecological significance 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 or fill the wetland;
- (d) impact bank stability; or
- (e) result in the clearing of riparian vegetation outside of the minimum area practicable to carry out the works.

(B12) The construction or maintenance of linear infrastructure that will result in significant disturbance in or on the bed and banks of a watercourse, or construction and/or maintenance activities within a general ecologically significant wetland or wetland of high ecological significance must not release from the site any contaminants to any waters that exceed the water quality limits specified in *Schedule B, Table 1 – Release Limits to Waters*.

Schedule B, Table 1 – Release Limits to Waters

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

(B13) Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (B12).

(B14) After the construction or maintenance works for petroleum activities in a general ecologically significant wetland or a wetland of high ecological significance are completed, the petroleum infrastructure must not:

- (a) drain or fill the wetland;
- (b) prohibit the flow of surface water in or out of the wetland;

- (c) lower or raise the water table and hydrostatic pressure outside the bounds of natural variability that existed before the activities commenced;
- (d) result in ongoing negative impacts to water quality;
- (e) result in bank instability; or
- (f) result in fauna ceasing to use adjacent areas for habitat, feeding, roosting or nesting.

Register of activities in wetlands and watercourses

- (B15) A register must be kept of all significant construction and maintenance activities carried out from 17 November 2016, causing disturbance and conducted in a general ecologically significant wetland, a wetland of high ecological significance and a watercourse, which must include:
- (a) location of the activity (e.g. GPS coordinates (GDA94));
 - (b) estimated flow rate of the surface water at the time of the activity;
 - (c) duration of works; and
 - (d) results of impact monitoring carried out under condition (B13).

Activities in floodplains

- (B16) Where the petroleum activity(ies) is carried out on floodplains the 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 environmental harm; 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.

3 SCHEDULE C – GROUNDWATER

- (C1) The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to any watercourse, lake, wetland or spring.

Seepage monitoring program

- (C2) A Seepage Monitoring Program must be developed by a suitably qualified person that is commensurate with the site-specific risk of contaminant seepage from containment facilities and able to determine if seepage of contaminants to groundwater is occurring as a result of storing contaminants in containment facilities by 17 November 2017.
- (C3) The Seepage Monitoring Program, must include, but not necessarily be limited to:
- (a) identification of the containment facilities for which seepage will be monitored;
 - (b) identification of the trigger parameters that are associated with the potential or actual contaminants stored in the containment facility;
 - (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 the upper-most aquifer 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 sensitive receptors (i.e. groundwater dependent ecosystems, water supply bores)
 - (iii) provide for the early detection of negative impacts prior to reaching migration pathways to other aquifers and 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 a sufficient frequency that will allow for early detection of contaminants for the trigger parameters identified in condition C3(b);
 - (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions C3(b) and C3(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.

Monitoring bores

- (C4) A drill bore log must be completed for each seepage monitoring bore in condition (C3), 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.

4 SCHEDULE D – DAMS

- (D1) 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)* at the following times:
- (a) following the design and prior to construction of the structure, if it is not an existing structure; or
 - (b) prior to any change in its purpose or the nature of its stored contents.
- (D2) 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.
- (D3) 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

- (D4) Conditions (D5) to (D9) inclusive do not apply to existing structures.
- (D5) All regulated structures must be designed by, and constructed under the supervision of, a suitably qualified and experienced person in accordance with the requirements of the *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2016/1933)*.
- (D6) 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.
- (D7) 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.
- (D8) 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.
- (D9) Certification by the suitably qualified and experienced person who supervises the construction must be submitted to the administering authority on the completion of construction of the regulated structure, and state that:

- a) the 'as constructed' drawings and specifications meet the original intent of the design plan for that regulated structure; and
- b) construction of the regulated structure is in accordance with the design plan.

Notification of affected persons

- (D10) All affected persons must be provided with a copy of the emergency action plan in place for each regulated structure:
- a) for existing structures that are regulated structures, within 10 business days of this condition taking effect;
 - b) prior to the operation of the new regulated structure; and
 - c) if the emergency action plan is amended, within 5 business days of it being amended.

Operation of a regulated structure

- (D11) Operation of a regulated structure, except for an existing structure, is prohibited unless the holder has submitted to the administering authority in respect of the 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 (D6);
 - b) a set of 'as constructed' drawings and specifications;
 - c) certification of those 'as constructed drawings and specifications' in accordance with condition (D9);
 - 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 structures.
- (D12) For existing structures that are regulated structures:
- a) where the existing structure that is a regulated structure is to be managed as part of an integrated containment system for the purpose of sharing the DSA volume across the system, the holder must submit to the administering authority within 12 months of the commencement of this condition a copy of the certified system design plan including that structure; and
 - b) an operational plan for the existing structures must be developed and implemented within 12 months of the commencement of this condition.
- (D13) Each regulated structure must be maintained and operated, for the duration of its operational life until decommissioned and rehabilitated, in a manner that is consistent with the current operational plan and, if applicable, the current design plan and associated certified 'as constructed' drawings.
- (D14) Conditions (D15) to (D20) inclusive, apply to Regulated Structures which have not been certified as low consequence category for 'failure to contain – overtopping' scenario only.

Mandatory reporting level

- (D15) 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.
- (D16) 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 structure.
- (D17) The holder must record any changes to the MRL in the Register of Regulated Structures.

Design storage allowance

- (D18) 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.
- (D19) 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 DSA volume for the structure (or network of linked containment systems).
- (D20) The holder must, immediately on becoming aware that a regulated structure (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 structure or linked containment systems.

Annual inspection report

- (D21) Each regulated structure must be inspected each calendar year by a suitably qualified and experienced person.
- (D22) 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.
- (D23) 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)*.
- (D24) The holder must within 20 business days of receipt of the annual inspection report, provide to the administering authority:
- the recommendations section of the annual inspection report; and
 - if applicable, any actions being taken in response to those recommendations; and
 - 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 days of receipt of the request.

Transfer arrangements

- (D25) 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.

Register of regulated structures

- (D26) A Register of Regulated Structures must be established and maintained by the holder for each regulated structure.
- (D27) 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.
- (D28) The holder must make a final entry of the required information in the Register of Regulated Structures once compliance with condition (D11) and (D12) has been achieved.
- (D29) The holder must ensure that the information contained in the Register of Regulated Structures is current and complete on any given day.
- (D30) 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.
- (D31) 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.

Transitional arrangements

- (D32) All existing structures that have not been assessed in accordance with either the Manual or the former *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams* must be assessed and certified in accordance with the Manual by 17 November 2017.
- (D33) All existing structures must subsequently comply with the timetable for any further assessments in accordance with the Manual specified in *Schedule D - Table 1 Transitional Hydraulic Performance Requirements for Existing Structures*, depending on the consequence category for each existing structure assessed in the most recent previous certification for that structure.

Schedule D – Table 1 Transitional Hydraulic Performance Requirements for Existing Structures

Transition period required for existing structures to achieve the requirements of the <i>Manual for Assessing Consequence Categories and Hydraulic Performance of Dams</i>			
Compliance with criteria	High	Significant	Low
>90% and a history of good compliance performance in last 5 <u>years</u>	No transition required	No transition required	No transitional conditions apply. Review <u>consequence assessment</u> every 7 <u>years</u> .
>70%-≤90%	Within 7 <u>years</u> , unless otherwise agreed with the <u>administering</u>	Within 10 <u>years</u> , unless otherwise agreed with the <u>administering</u>	No transitional conditions apply. Review <u>consequence</u>

	<u>authority</u> , based on no history of unauthorised releases.	<u>authority</u> , based on no history of unauthorised releases.	<u>assessment</u> every 7 <u>years</u> .
>50-≤70%	Within 5 <u>years</u> unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 7 <u>years</u> unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Review <u>consequence assessment</u> every 7 <u>years</u> .
≤50%	Within 5 <u>years</u> or as per compliance requirements (e.g. TEP timing) unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Within 5 <u>years</u> or as per compliance requirements (e.g. TEP timing) unless otherwise agreed with the <u>administering authority</u> , based on no history of unauthorised releases.	Review <u>consequence assessment</u> every 5 <u>years</u> .

(D34) *Schedule D - Table 1 Transitional Hydraulic Performance Requirements for Existing Structures* ceases to apply for a structure once any of the following events has occurred:

- (a) it has been brought into compliance with the hydraulic performance criteria applicable to the structure under the Manual; or
- (b) it has been decommissioned; or
- (c) it has been certified as no longer being assessed as a regulated structure.

(D35) Certification of the transitional assessment required by (D32) and (D33) (as applicable) must be provided to the administering authority by 17 November 2017.

5 SCHEDULE E – LAND

- (E1) Contaminants must not be directly or indirectly released to land except as permitted under this environmental authority.
- (E2) Top soil must be managed in a manner that preserves its biological and chemical properties.
- (E3) 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.
- (E4) Associated water produced from the authorised petroleum activity(ies) may be used for the following in accordance with condition (E3):
- (a) for dust suppression on roads;
 - (b) for construction and operational purposes for the petroleum activity(ies) authorised by this environmental authority;
 - (c) domestic and stock purposes.
- (E5) Associated water produced from the authorised petroleum activity(ies) may be transferred to a third party to be used for the following purposes subject to compliance with conditions (E6) and (E7):
- (a) dust suppression;
 - (b) construction and operational purposes;
 - (c) livestock watering purposes.
- (E6) By 17 May 2018, any associated water supplied to a third party for livestock watering purposes in accordance with condition (E5)(c) must meet the *ANZECC and ARMCANZ Water Quality Guidelines 2000* for livestock watering purposes, as amended from time to time.
- (E7) If the responsibility of associated water is given or transferred to a third party in accordance with condition (E5), the holder of environmental authority must ensure that:
- (a) the responsibility of the associated 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*.

Hydrostatic Test Water and Low Point Drains

- (E8) Contaminants that are hydrostatic test water from pipelines and contaminants from low point drains may be released to land in accordance with condition (E3).

Sewage treatment works

- (E9) Treated sewage effluent or greywater from a treatment system with a daily peak design capacity of less than 21 equivalent persons (EP) may be released to land provided it:
- (a) be to a fenced and signed contaminant release area(s);
 - (b) does not contain any properties nor contain any organisms or other contaminants in concentrations that are capable of causing environmental harm;
 - (c) not result in pooling or run-off or aerosols or spray drift or vegetation die-off;
 - (d) minimises deep drainage below the root zone of any vegetation;
 - (e) does not adversely affect the quality of shallow aquifers;
 - (f) be to a contaminant release area(s) that is kept vegetated with groundcover, that is:
 - (i) not a declared plant pest species; and
 - (ii) kept in a viable state for transpiration and nutrient uptake.

Chemical storage

- (E10) Chemical storage and fuel storage must effectively contain the chemicals and fuels stored, and where relevant, meet Australian Standards where such a standard is applicable.

6 SCHEDULE F – PROTECTION OF BIODIVERSITY VALUES

- (F1) Conditions (F1) to (F8) inclusive in *Schedule F – Protecting Biodiversity Values* do not apply to the petroleum activity(ies) which commenced prior to 17 November 2016.

Confirming biodiversity values

- (F2) Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground biodiversity values of the native vegetation communities at the location must be undertaken by a suitably qualified person.
- (F3) A suitably qualified person must develop and certify a methodology so that condition (F2) can be complied with and which is appropriate to confirm on-the-ground biodiversity values by 17 May 2017.
- (F4) Where mapped biodiversity values differ from those confirmed under conditions (F2) and (F3), petroleum activities may proceed in accordance with the conditions of the environmental authority based on the confirmed on-the-ground biodiversity value.

Planning for land disturbance

- (F5) 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 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.

Planning for land disturbance – linear infrastructure

- (F6) Linear infrastructure construction corridors must:
- (a) maximise co-location
 - (b) be minimised in width to the greatest practicable extent; and
 - (c) for linear infrastructure that is an essential petroleum activity authorised in an environmentally sensitive area or its protection zone, be no greater than 40m in total width.

Authorised disturbance to environmentally sensitive areas

- (F7) Where petroleum activities are to be carried out in environmentally sensitive areas or their protection zones, the petroleum activities must be carried out in accordance with *Schedule F, Table 1—Authorised petroleum activities in environmentally sensitive areas and their protection zones*.

Schedule F, Table 1—Authorised petroleum activities in environmentally sensitive areas and their protection zones

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
<u>Category A ESAs</u>	No petroleum activities permitted	<u>Only low impact petroleum activities</u> permitted.	<u>Only essential petroleum activities</u> permitted
<u>Category B ESAs</u> excluding 'Endangered' <u>Regional Ecosystems</u>	<u>Only low impact petroleum activities</u> permitted	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	Petroleum activities permitted
<u>Category B ESAs</u> that are 'Endangered' <u>Regional Ecosystems</u>	<u>Only essential petroleum activities</u> permitted	<u>Only essential petroleum activities</u> permitted	Petroleum activities permitted
<u>Category C ESAs</u> that are Essential Habitat, Essential Regrowth Habitat and/or 'Of Concern' <u>Regional Ecosystems</u>	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	Petroleum activities permitted
<u>Category C ESAs</u> that are Nature Refuges, Koala Habitat and/or Declared Catchment Areas	<u>Only low impact petroleum activities</u> permitted	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	Petroleum activities permitted
<u>Category C ESAs</u> that are Resource Reserves	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	<u>Only essential petroleum activities</u> permitted Subject to condition (F8)	Petroleum activities permitted
<u>Category C ESAs</u> that are State Forests and/or Timber Reserves	<u>Only essential petroleum activities</u> permitted	Petroleum activities permitted	Petroleum activities permitted

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.

- (F8) If essential petroleum activity(ies) are located within a primary protection zone or secondary protection zone of an environmentally sensitive area, that the activity(ies) must not negatively affect the adjacent environmentally sensitive area.

7 SCHEDULE G – PROTECTION OF ACOUSTIC VALUES

- (G1) Notwithstanding condition (A21), emission of noise from the petroleum activity(ies) at levels less than those specified in *Schedule G, Table 1—Noise Nuisance Limits* are not considered to be environmental nuisance.

Schedule G, Table 1—Noise Nuisance Limits

Time period	Metric	<u>Short term noise event</u>	<u>Medium term noise event</u>	<u>Long term noise event</u>
7:00am—6:00pm	<u>L_{Aeq,adj,15 min}</u>	45 dBA	43 dBA	40 dBA
6:00pm—10:00pm	<u>L_{Aeq,adj,15 min}</u>	40 dBA	38 dBA	35 dBA
10:00pm—6:00am	<u>L_{Aeq,adj,15 min}</u>	28 dBA	28 dBA	28 dBA
	<u>Max L_{pA, 15 mins}</u>	55 dBA	55 dBA	55 dBA
6:00am—7:00am	<u>L_{Aeq,adj,15 min}</u>	40 dBA	38 dBA	35 dBA

1. 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

- (G2) If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in *Schedule G, Table 2—Adjustments to be added to Noise Levels at Sensitive Receptors* are to be added to the measured noise level(s) to derive L_{Aeq, adj, 15 min}.

Schedule G, 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
<u>Impulsive</u> characteristic is detectable	+ 2 to + 5 dBA

- (G3) Notwithstanding condition (G1), emission of any low frequency noise must not exceed either (G3)(a) and (G3)(b), or (G3)(c) and (G3)(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.
- (G4) A Blast Management Plan must be developed for each blasting activity in accordance with Australian Standard 2187.
- (G5) 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.
- (G6) 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.

8 SCHEDULE H – PROTECTING AIR VALUES

- (H1) 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 (H1)(a) and (H1)(b) and (H1)(c), or with (H1)(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.

Fuel burning and combustion facilities

- (H2) A fuel burning or combustion facility must not be operated.

9 SCHEDULE I – WASTE

- (I1) All general and regulated waste removed from the site must be sent to a facility that is lawfully able to accept the waste under the *Environmental Protection Act 1994* except as permitted under another condition of this environmental authority.
- (I2) All regulated waste removed from the site must be undertaken by a person who holds a current authority to transport such waste under the provisions of the *Environmental Protection Act 1994*.
- (I3) A record of all regulated waste removed from the site must be kept detailing the following information:
 - (a) Date of pickup of waste;
 - (b) Description of waste;
 - (c) Quantity of waste;
 - (d) Origin of waste; and
 - (e) Destination of waste.

Residual drilling materials

- (I4) From 17 November 2016, residual drilling material must be managed in accordance with conditions (I5) to (I7).
- (I5) If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
- (I6) 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.
- (I7) Records must be kept to demonstrate compliance with conditions (I5) and (I6).

10 SCHEDULE J – REHABILITATION

- (J1) Condition (J3) only applies to petroleum activities which commenced before 17 November 2016.
- (J2) Condition (J1) applies subject to:
- (a) the holder of this environmental authority completing an inventory of all existing petroleum activities which commenced before 17 November 2016; and
 - (b) The holder of this environmental authority providing the inventory to the administering authority upon written request within the requested timeframe.
- (J3) Rehabilitation of disturbed areas must take place progressively as works are staged.

Remaining dams

- (J4) Where there is a dam (including a low consequence dam) that is being or intended to be utilised 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.

Rehabilitation planning

- (J5) Conditions (J6) - (J15) relating to rehabilitation only apply to petroleum activities which commenced after 17 November 2016.
- (J6) 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 (J7) to (J14), inclusive; and
 - (ii) provide for appropriate monitoring and maintenance.

Transitional rehabilitation

- (J7) 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 plant pest species, is growing; or
 - (ii) an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.

Final rehabilitation acceptance criteria

- (J8) 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% of native ground cover species richness
 - (b) greater than or equal to the total per cent of ground cover
 - (c) less than or equal to the per cent species richness of declared plant pest species; and
 - (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then at least one regional ecosystem(s) from the same broad vegetation group, and with the equivalent biodiversity status or a biodiversity status with a higher conservation value as any of the regional ecosystem(s) in either the adjacent land or pre-disturbed land, must be present.

Final rehabilitation acceptance criteria in environmentally sensitive areas

- (J9) 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 (F2) and (F3)) 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 declared plant 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.

Continuing conditions

- (J10) Conditions (J7), (J8) and (J9) continue to apply after this environmental authority has ended or ceased to have effect.

Decommissioning of pipelines

- (J11) All pipelines must be decommissioned in accordance with the requirements of Australian Standard 2885, as amended from time to time.

Progressive rehabilitation

- (J12) Pipelines trenches must be backfilled immediately after pipe laying and rehabilitated as soon as practicable but not longer than three (3) months after completion.
- (J13) During backfilling of pipeline trenches, soils must be replaced so that:
- (a) for cropping land the top two (2) soil horizons are consistent with the soil horizons of the immediately surrounding area; and
 - (b) for semi-desert rangelands the topsoil must be consistent with the adjacent topsoil.
- (J14) Backfilled and rehabilitated pipeline trenches must:
- (a) be a stable landform; and
 - (b) exhibit no subsidence or erosion gullies for the life of the operational pipeline; and
 - (c) be re-profiled to a level consistent with surrounding soils; and
 - (d) be re-profiled to original contours and established drainage lines; and
 - (e) be visually consistent with the surround land features; and
 - (f) be vegetated with groundcover which is not a weed species as a minimum to ensure that erosion is minimised.

11 SCHEDULE K — WELL CONSTRUCTION, MAINTENANCE AND STIMULATION ACTIVITIES

- (K1) Drilling activities must not result in the connection of the target formation and another aquifer.
- (K2) 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

- (K3) Stimulation activities must not cause the connection of the target formation and another aquifer.
- (K4) The holder of this environmental authority must ensure internal and external mechanical integrity of the well system prior to and during stimulation 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.
- (K5) Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target formation and another aquifer if an aquifer is present within 200 metres above or below the target formation(s) and is spatially located with a two (2) kilometre radius from the location of the stimulation initiation point.

Stimulation Risk Assessment

- (K6) By 17 May 2017, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.
- (K7) The stimulation risk assessment must address issues at a relevant geospatial scale such that changes to features and attributes are adequately described and must include, but not necessarily be limited to:
- (a) a process description of the stimulation activity to be applied, including equipment;
 - (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 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 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;
 - (ii) 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 if an aquifer is present within 200 metres above or below the target formation(s) and is spatially located within a two (2) kilometre radius from the location of the initiation point;
- (i) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
- (j) consideration of barriers or known direct connections between the target formation and the overlying and underlying aquifers;
- (k) a description of the well mechanical integrity testing program;
- (l) process control and assessment techniques to be applied for determining extent of stimulation activities (e.g. microseismic measurements, modelling etc);
- (m) practices and procedures to ensure that the stimulation activities are designed to be contained within the target formation;
- (n) groundwater transmissivity, flow rate, hydraulic conductivity and direction(s) of flow;
- (o) 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;
- (p) a mass balance estimating the concentrations and absolute masses of chemicals that will be reacted, returned to the surface or left in the target formation subsequent to stimulation, subject to the risk assessment demonstrating that providing this information materially reduces the risk and alters the management strategies to be applied beyond that intended in monitoring or returned fluids detailed in the Stimulation Impact Monitoring Program required in condition (K10);
- (q) 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;
- (r) an environmental hazard assessment of the chemicals used including mixtures and the resultant chemicals that are formed after stimulation;
- (s) identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities where such beads have been used or are proposed to be used;
- (t) an environmental hazard assessment of leaving chemical compounds in stimulation fluids in the target gas producing formation for extended periods subsequent to stimulation;
- (u) risk characterisation of environmental impacts based on the environmental hazard assessment; ..
- (v) potential impacts to landholder bores as a result of stimulation activities;
- (w) 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

- (x) 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

- (K8) By 17 May 2017, a baseline bore assessment must be undertaken of the water quality of:
 - (a) landholders' active groundwater bores (subject to access being permitted by the landholder) that are within 200 metres above or below the target formation and are spatially located within a two (2) kilometre radius from the location of the stimulation initiation point; and
 - (b) 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 (K6) and (K7).
- (K9) Baseline bore assessments required in condition (K8) 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

- (K10) A Stimulation Impact Monitoring Program must be developed within 3 months of completion of the stimulation risk assessment required by condition (K7). The stimulation impact monitoring program 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 (K7) and (K8) 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) all bores in accordance with condition (K8).
- (K11) The Stimulation Impact Monitoring Program must provide for monitoring of:
 - (a) analytes and physico-chemical parameters relevant to stimulation baseline bore assessments required by conditions (K8) and (K9); 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 if an aquifer is present within 200 metres above or below the target formation(s) and is spatially located with a two (2) kilometre radius from the location of the stimulation initiation point.
- (K12) The Stimulation Impact Monitoring Program must provide for monitoring of the bores in condition (K10)(c) at the following minimum frequency:
 - (a) monthly for the first six (6) months subsequent to stimulation activities being undertaken; then
 - (b) annually for the first five (5) years subsequent to stimulation activities being undertaken or until analytes and physico-chemical parameters listed in condition (K7) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.
- (K13) The results of the Stimulation Impact Monitoring Program must be made available to any potentially affected landholder upon request by that landholder.

Waterflooding or Injection activities

(K14) Waterflooding or injection activities are not permitted.

12 SCHEDULE L — DEFINITIONS

Note: Terms which are defined in this environmental authority are underlined. Where a term is not defined in this environmental authority, the definition in the *Environmental Protection Act 1994*, its regulations and Environmental Protection Policies, then the *Acts Interpretation Act 1954*, then the Macquarie Dictionary, then the *Petroleum and Gas (Production and Safety) Act 2004* or its regulations, must be used in that order.

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.

alternative arrangement means a written agreement about the way in which particular environmental nuisance impacts 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 not necessarily be limited to, a range of nuisance abatement measures to be installed at the sensitive or provision of alternative accommodation for the duration of the nuisance impact.

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

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.

annual return period means the most current 12-month period between two anniversary dates.

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	
Electrical Conductivity	
Chloride*	

*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	Parameter Maximum concentration
Arsenic	20mg/kg
Selenium	5mg/kg
Boron	100mg/kg
Cadmium	3mg/kg
Chromium (total)	400mg/kg
Copper	100mg/kg
Lead	600mg/kg

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

aquifer(s) means an identifiable stratigraphic formation that has the potential to produce useful flows of water and may include formations where due to hydraulic fracturing activity a changed hydraulic conductivity allows such water flows

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:

- operations of any kind and all things constructed, erected or installed for that dam; and
- any land used for those operations.

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 become 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*.

background noise level means the sound pressure level, measured in the absence of the noise under investigation, as the $L_{A90,T}$ being the A-weighted sound pressure level exceeded for 90 percent of the measurement time period T of not less than 15 minutes, using Fast response.

bed of any watercourse, has the meaning in Schedule 12 of the *Environmental Protection Regulation 2008* and

- (a) includes an area covered, permanently or intermittently, by tidal or non-tidal waters; but
- (b) does not include land adjoining or adjacent to the bed that is from time to time covered by floodwater.

being or intended to be utilised by the landholder or overlapping tenure holder means 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.

biodiversity values for the purposes of this environmental authority, means environmentally sensitive areas, prescribed environmental matters and wetlands.

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.

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 means a day that is not—

- a Saturday or Sunday; or
- a public holiday, special holiday or bank holiday in the place in which any relevant act is to be or may be done.

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

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

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

- Nature Refuges as defined under the *Nature Conservation Act 1992*;
- Koala Habitat Areas as defined under the Nature Conservation (Koala) Conservation Plan 2006;
- State Forests or Timber Reserves as defined under the *Forestry Act 1959*;
- Regional parks (previously known as Resources reserves) 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*; or
- ‘Of Concern Regional Ecosystems’ that are remnant vegetation and identified in the database called ‘RE description database’ containing Regional Ecosystem numbers and descriptions.

certification or certifying, or certify or certified means assessment and approval must be undertaken by a suitably qualified and experienced person in relation to any assessment or documentation required by 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, 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)).

certify or certification or certified 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
- that the opinions expressed in the document are honestly and reasonably held.

chemical has the meaning provided in Schedule 12 of the *Environmental Protection Regulation 2008*.

chemical storage consists of storing less than the limits referred to in Schedule 2, section 8(1) of the *Environmental Protection Regulation 2008*.

clearing has the meaning in the *Vegetation Management Act 2000* and for vegetation means;
(a) 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.

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)* as amended from time to time.

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 purposes 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.

cropping means land use of the disturbance area immediately prior to the petroleum use that comprised:
(a) the yield of any form of cultivated crop for any purpose, including, for example, for food, fibre, fodder or medicinal purposes;
(b) the growing of trees to produce, or as a component for, food, fibre or a medicinal product; and/or
(c) harvesting a timber plantation.'

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(s) means a land-based structure or a void that is designed to contain, divert or control flowable substances, and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and associated works.

declared plant pest 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.

decommissioned in relation to pipelines means the action undertaken to prepare the pipeline and peripheral facilities for pending suspension or abandonment.

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 Hazard Categories and Hydraulic Performance of Dams*, published by the administering authority, as amended from time to time, that 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 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.

document or documentation 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.

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.

environmentally sensitive area means Category A, B or C environmentally sensitive areas (ESAs)

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:

1. $EP = V/200$ 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

2. $EP = M/2.5$ 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.

essential petroleum activities means activities that are essential to bringing the resource to the surface and are only the following:

- low impact petroleum activities
- geophysical, geotechnical, geological, topographic and cadastral surveys (including seismic, sample /test / geotechnical pits, core holes)
- single well sites not exceeding 1 hectare disturbance and multi-well sites not exceeding 1.5 hectare disturbance
- well sites with monitoring equipment (including monitoring bores):
 - for single well sites, not exceeding 1.25 hectares disturbance
 - for multi-well sites, not exceeding 1.75 hectares disturbance
- well sites with monitoring equipment (including monitoring bores) and tanks (minimum 1 ML) for above ground fluid storage:
 - for single well sites, not exceeding 1.5 hectares disturbance
 - for multi-well sites, not exceeding 2.0 hectares disturbance
- associated infrastructure located on a well site necessary for the construction and operations of wells:
 - water pumps and generators
 - flares and flare pits
 - chemical / fuel storages
 - sumps for residual drilling material and drilling fluids
 - tanks, or dams which are not significant or high consequence dams to contain wastewater (e.g. stimulation flow back waters, associated water)
 - pipe laydown areas
 - soil and vegetation stockpile areas
 - a temporary camp associated with a drilling rig that may involve sewage treatment works that are no release works
 - temporary administration sites and warehouses
 - dust suppression activities using water that meets the quality and operational standards approved under the environmental authority
- communication and power lines that are necessary for the undertaking of petroleum activities and that are located within well sites, well pads and pipeline right of ways without increasing the disturbance area of petroleum activities
- supporting access tracks
- gathering / flow pipelines from a well head to the initial compression facility
- activities necessary to achieve compliance with the conditions of the environmental authority in relation to another essential petroleum activity (e.g. sediment and erosion control measures, rehabilitation).

existing authority has the meaning in section 94 of the *Environmental Offsets Act 2014*.

existing structure means a structure that existed prior to 16 November 2016.

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.

floodplain(s) has the meaning in the *Water Act 2000* and means an area of reasonably flat land adjacent to a watercourse that—

- is covered from time to time by floodwater overflowing from the watercourse; and
- does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and
- has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island in the watercourse.

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

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 *Environmental 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 ecosystem (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 dependant ecosystems do not include those mapped as “unknown”.

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

hydraulic integrity refers to the capacity of a dam to contain or safely pass flowable substances based on its design.

hydraulic performance means the capacity of a regulated dam to contain or safely pass flowable substances based the design criteria specified for the relevant consequence category in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (ESR/2016/1933)*.

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 Condition (A1)(a).

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

infrastructure means plant or works including for example, communication systems, compressors, powerlines, pumping stations, reservoirs, roads and tracks, water storage dams, evaporation or storage ponds and tanks, equipment, buildings and other structures built for the purpose and duration of the conduct of the petroleum activity(ies) including temporary structures or structures of an industrial or technical nature, including, for example, mobile and temporary camps.

Infrastructure does not include other facilities required for the long term management of the impact of those petroleum activities or the protection of potential resources. Such other facilities include dams other than water storage dams, pipelines and assets, that have been decommissioned, rehabilitated, and lawfully recognised as being subject to subsequent transfer with ownership of the land.

inventory in relation to existing petroleum activities means:

- relevant shapefiles which clearly show the location of infrastructure; and
- metadata for the relevant shapefiles which includes the infrastructure ID, latitude and longitude, and date of disturbance for the activity.

L_{Aeq, adj, 15 mins} means the A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character that within any 15 minute period has the same square sound pressure as a sound level that varies with time.

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.

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*.

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.

linear infrastructure means communication and 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 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)*, published by the administering authority.

low impact petroleum activities means petroleum activities which do not result in the clearing of native vegetation, cause disruption to soil profiles through earthworks or excavation or result in significant disturbance to land which cannot be rehabilitated immediately using hand tools after the activity is completed. Examples of such activities include but are not necessarily limited to soil surveys (excluding test pits), topographic surveys, cadastral surveys and ecological surveys, may include installation of monitoring equipment provided that it is within the meaning of low impact and traversing land by car or foot via existing access tracks or routes or in such a way that does not result in permanent damage to vegetation.

mandatory reporting level or **MRL** means a warning and reporting level determined in accordance with the criteria in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams (ESR/2016/1933)*, published by the administering authority, as amended from time to time.

Manual means *Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (ESR/2-16/1933)* as published by the administering authority, as amended from time to time.

Map of referable wetlands has the meaning in Schedule 12 of the *Environmental Protection Regulation 2008* and means the 'Map of referable wetlands', 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.

Max $L_{pA, 15 \text{ min}}$ means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

Max $L_{pZ, 15 \text{ min}}$ 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 enquiry.

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 ($k_w=10-8\text{m/s}$) 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:

- normal operating procedures and rules (including clear documentation and definition of process inputs in the DSA); and
- 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.

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 environmental matters has the meaning in section 10 of the *Environmental Offsets Act 2014*, limited to the matters of State environmental significance listed in schedule 2 of the *Environmental Offsets Regulation 2014*.

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 200 m 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.

protection zone means the primary protection zone of any Category A, B or C Environmentally Sensitive Area or the secondary protection zone of any Category A or B Environmentally Sensitive Area.

regional ecosystem 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 of geology, landform and soil. Regional ecosystems of Queensland were originally described in Sattler and Williams (1999). The Regional Ecosystem Description Database (Queensland Herbarium 2013) is maintained by Queensland Herbarium and contains the current descriptions of regional ecosystems.

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.

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 (ESR/2016/1933)*, published by the administering authority, 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 the acceptance criteria and, where relevant, includes remediation of contaminated land. For the purpose 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 topography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines (2013).

relevant act means:

- a) an act that causes serious or material environmental harm or an environmental nuisance;
- b) an act that contravenes a noise standard;
- c) a deposit of a contaminant, or release of stormwater run-off, mentioned in section 440ZG of the *Environmental Protection Act 1994*.

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

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.

restoration means the replacement of structural habitat complexity, ecosystem 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 amounts prescribed under a regulation:

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

revegetation or revegetating or revegetate means to 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 m 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
- for noise, a place defined as a sensitive receptor for the purposes of the *Environmental Protection (Noise) Policy 2008*.

sensitive receptor(s), as relates to noise, 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.

significant residual impact has the meaning in section 8 of the *Environmental Offsets Act 2014*.

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

specified relevant activities for this environmental activity means an activity that:

- 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
- stimulation activities; or
- extracting material other than by dredging.

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

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 involved the addition of chemicals. It includes hydraulic fracturing / hydrofracturing, fracture acidizing and the use of proppant treatments.

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

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

structure means a dam or levee.

Subterranean cave GDE means:

- an area identified as a subterranean cave in the mapping produced by the Queensland Government Information System, as amended from time to time; and
- a cave ecosystem which requires access to groundwater on a permanent or intermitted basis to meet all or some of their water requirements so as to maintain its communities of plants and animals, ecological processes and ecosystem services. Subterranean cave GDEs are caves dependent on the subterranean presence of groundwater. Subterranean cave GDEs have some degree of groundwater connectivity and are indicated by either high moisture levels or the presence of stygofauna, or both, referred to in the Queensland Government WetlandInfo mapping program, as amended from time to time.

Note: the Subterranean GDE (caves) dataset can be displayed through the Queensland Government WetlandInfo mapping program,

Note: the Subterranean DGE (caves) dataset can be obtained from the Queensland Government Information System,

suitably qualified person means a person who has professional qualifications, training, skills or experience relevant to the nominated subject matter and can give authoritative assessment, advice and analysis to performance relative to the subject matter using the relevant protocols, standards, methods or literature.

suitably qualified 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(s) means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.

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

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.

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

top soil means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300 mm in depth from the natural surface.

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

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

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

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

- a) a river, creek or stream in which water flows permanently or intermittently –
 - i. in a natural channel, whether artificially improved or not; or
 - ii. in an artificial channel that has changed the course of a watercourse.
- b) 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, completion and operation of a well including but not limited to cellar pits, dams and drill sumps.

well integrity means the ability of a well to contain the substances flowing through it.

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

wetland for the purpose of this environmental authority means:

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

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

wetland of high ecological significance means a wetland that meets the definition of a wetland and that is shown as a wetland of 'high ecological significance' or a wetland of "high ecological value" on the Map of Referable Wetlands.

year means a period of 12 months.

END OF AUTHORITY