Permit

Environmental Protection Act 1994

Environmental authority EA0001210

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

Environmental authority number: EA0001210

Environmental authority takes effect on 27 August 2019

Environmental authority holder(s)

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

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Resource Activity, Schedule 2A, 06: A petroleum activity carried out on a site containing a high hazard dam or a significant hazard dam	PL1021
Resource Activity, Schedule 2A, 03: A petroleum activity that is likely to have a significant impact on a category A or B environmentally sensitive area	PL1021
Resource Activity, Schedule 2A, 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	PL1021
Resource Activity, Ancillary 08 - Chemical Storage, 3: Storing more than 500 cubic metres of chemicals of class C1 or C2 combustible liquids under AS 1940 or dangerous goods class 3 under subsection (1)(c)	PL1021
Resource Activity, Ancillary 63 - Sewage Treatment, 1: Operating sewage treatment works, other than no-release works, with a total daily peak design capacity of, (b-i) more than 100 but not more than 1500EP if treated effluent is discharged from the works to an infiltration trench or through an irrigation scheme	PL1021

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Additional information for applicants

Environmentally relevant activities

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

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

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

Contaminated land

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

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

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

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

Take effect

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

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

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

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

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

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

Date issued: 03 September 2019

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SCHEDULE A – GENERAL CONDITIONS

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

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

(b) the following **specified relevant activities**:

(i) Sewage Treatment - Operating sewage treatment works, other than no release works;

(ii) Chemical and fuel storage – store more than 500m^3 of class C1 or C2 combustible liquids under AS1940 or dangerous goods class 3 subsection (1)(c)

(iii) Another activity where, for the **specified relevant activities** listed in (i) – (ii) above, Schedule 2 of the Environmental Protection Regulation 2008 (the Regulation) provides exemption for the activity, but only to the extent of the circumstances stated in Schedule 2 of the Regulation;

(iv) **Stimulation** activities; and

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

Schedule A, Table 1 – Scale and Intensity for the Activities

Infrastructure	Total Scale of Petroleum Activities and Infrastructure	Intensity (maximum size)
Exploration, appraisal and development wells	180	224ha
Electrified compressor facility(ies)	1	30ha
Sewage treatment plant(s) that discharge treated effluent to an infiltration trench or through an irrigation scheme, or to land for dust suppression, construction or operational purposes	4	100EP per facility
Regulated structures	1	15ha
Water treatment facilities	1	<10 ML/day

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

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

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

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

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

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Prevent or Minimise Likelihood of Environmental Harm

(A4) This environmental authority does not authorise environmental harm unless a condition contained in this environmental authority explicitly authorises that harm. Where there is no condition, the lack of a condition shall not be construed as authorising harm.

Monitoring

(A5) All monitoring required must be undertaken by a **suitably qualified person**.

(A6) If requested by the **administering authority** in relation to investigating a complaint, monitoring must be commenced within 10 business days.

(A7) All laboratory analyses and tests required must be undertaken by a laboratory that has **NATA accreditation** for such analyses and tests.

(A8) Notwithstanding condition (A7), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.

(A9) Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time:

(a) for **waters** and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – Environmental Protection (Water) Policy 2009
(b) for groundwater, Groundwater Sampling and Analysis – A Field Guide (2009:27 GeoCat #6890.1)
(c) for noise, the *Environmental Protection Regulation 2008*
(d) for air, the Queensland Air Quality Sampling Manual and/or Australian Standard 4323.1:1995 Stationary source emissions method 1: Selection of sampling positions, as appropriate for the relevant measurement
(e) for soil, the Guidelines for Surveying Soil and Land Resources, 2nd edition (McKenzie et al. 2008), and/or the Australian Soil and Land Survey Handbook, 3rd edition (National Committee on Soil and Terrain, 2009)
(f) for dust, **Australian Standard AS3580**.

Financial assurance

(A10) Petroleum activities that cause significant disturbance to land must not be carried out until financial assurance has been given to the administering authority as security for compliance with the environmental authority and any costs or expenses, or likely costs or expenses, mentioned in section 298 of the *Environmental Protection Act 1994*.

(A11) 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.

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(A12) 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.

Contingency procedures for emergency environmental incidents

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

(a) A clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity.
(b) Consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity.
(c) Response procedures to be implemented to prevent or minimise the risks of **environmental harm** occurring.
(d) The practices and procedures to be employed to restore the environment or mitigate any environmental harm caused.
(e) Procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land.
(f) Training of staff to enable them to effectively respond.
(g) Procedures to notify the administering authority, local government and any potentially impacted landholder.

Maintenance of plant and equipment

(A14) All plant and equipment must be maintained and operated in their proper and effective condition.

(A15) The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable:

(a) regulated dams and low consequence dams
(b) **exploration**, **appraisal** and **development wells**
(c) water treatment facilities
(d) sewage treatment facilities
(e) specifically authorised discharge points to air and waters
(f) any chemical storage facility associated with the environmentally relevant activity of chemical storage
(g) field compressor stations
(h) central compressor stations
(i) gas processing facilities; and
(j) pipeline compressor stations.

(A16) Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure, dams and pipeline trenches.

Complaints

(A17) Petroleum activities must not cause **environmental nuisance** at a **sensitive place**, other than where an **alternative arrangement** is in place.

Documentation

(A18) 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.

(A19) All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.

(A20) All **documents** required to be developed under this environmental authority must be kept for five (5) years.

(A21) 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.

(A22) 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.

Third Party Audit

(A23) A **third party auditor**, nominated by the holder of this environmental authority and accepted by the administering authority, must audit compliance with the conditions of this environmental authority at a minimum frequency of every three (3) years.

(A24) Notwithstanding condition (A23), and prior to undertaking the third party audit, the scope and content of the third party audit can be negotiated with the administering authority.

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(A25) An audit report must be prepared and **certified** by the third party auditor presenting the findings of each audit carried out.

(A26) 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.

(A27) A written response must be attached to the audit report detailing the actions taken or to be taken on stated dates:
(a) by the holder to ensure compliance with this environmental authority; and
(b) to prevent a recurrence of any non-compliance issues identified.

(A28) The audit report required by condition (A25) and the written response to the audit report required by condition (A27) must be submitted with the subsequent annual return.

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SCHEDULE B – WATER

General

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

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

Works in watercourses and wetlands

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

(B4) The construction and/or maintenance of linear infrastructure that will result in significant disturbance in or on the **bed and banks** of a watercourse or within a **general ecological significant wetland** must be conducted in accordance with the following order of preference:
(a) conducting works in times when there is no water present;
(b) conducting works in times of no flow;
(c) conducting works in times of flow but in a way that does not impede low flow.

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

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

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

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

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

(a) location of the activity (e.g. GPS coordinates (**GDA**94) and watercourse name)
(b) estimated flow rate or surface water at the time of the activity
(c) duration of work
(d) results of impact monitoring carried out under condition (B6).

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

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

(B10) Linear infrastructure activities, other than linear infrastructure construction and/or maintenance activities, must not change the existing surface water hydrological regime of any general ecologically significant wetland.

(B11) The construction and/or maintenance of linear infrastructure in any general ecologically significant wetland must not:

(a) prohibit the flow of surface water in or out of the wetland;
(b) impact surface water quality in the wetland unless specifically authorised by this environmental authority;
(c) drain the wetland;
(d) fill the wetland;
(e) impact bank stability; or
(f) result in the clearing of riparian vegetation outside of the required footprint.

Floodplains

(B12) Where the petroleum activity is carried out on **floodplains** the petroleum activity must be carried out in a way that does not:
(a) concentrate flood flows in a way that will or may cause or threaten an adverse environmental impact; or
(b) divert flood flows from natural drainage paths and alter flow distribution; or
(c) increase the local duration of floods; or
(d) increase the risk of detaining flood flows.

Seepage monitoring program

(B13) A seepage monitoring program must be developed by a suitably qualified person which is commensurate with the site-specific risks of contaminant seepage from containment facilities, and which requires and plans for detection of any seepage of contaminants to groundwater as a result of storing contaminants by 23 June 2018.

(B14) The seepage monitoring program required by condition (B13) must include but not necessarily be limited to:
(a) identification of the containment facilities for which seepage will be monitored

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

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

(d) installation of background seepage monitoring bores where groundwater quality will

not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts

(e) installation of seepage monitoring bores that:

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

(ii) provide for the early detection of negative impacts prior to reaching **groundwater dependent ecosystems**, landholder's active groundwater bores, or water supply bores
(iii) provide for the early detection of negative impacts prior to reaching migration pathways to other formations (i.e. faults, areas of unconformities known to connect two or more formations)

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

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

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

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

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

Schedule B, Table 2 – Seepage Monitoring Trigger Parameters

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

Seepage monitoring bore drill log

(B16) A bore drill log must be completed for each seepage monitoring bore in condition (B14) which must include:
(a) bore identification reference and geographical coordinate location
(b) specific construction information including but not limited to depth of bore, depth and length of casing, depth and length of screening and bore sealing details
(c) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters
(d) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and
(e) target formation of the bore.

Well testing

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

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

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

SCHEDULE C – LAND

General

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

Top soil management

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

Erosion and sediment control

(C3) For activities involving significant disturbance to land, **control measures** that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to:
- (a) preferentially divert stormwater around significantly disturbed land, or allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities;
- (b) minimise soil erosion resulting from wind, rain, and flowing water;
- (c) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water;
- (d) minimise work-related soil erosion and sediment runoff; and
- (e) minimise negative impacts to land or properties adjacent to the activities (including roads).

Land management

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

Chemical storage

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

Pipeline operation and maintenance

(C6) Contaminants authorised to be released to land under conditions (C7), (C9), and (C15) must be carried out in a manner that ensures:
(a) vegetation is not damaged;
(b) soil quality is not adversely impacted;
(c) there is no surface ponding or runoff beyond the designated release area;
(d) there is no aerosols or odours;
(e) deep drainage below the root zone of any vegetation is minimised;
(f) the quality of shallow aquifers is not adversely affected.

Pipeline wastewater

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

(C8) **Produced water** may be re-used in:
(a) drilling and well hole activities; or
(b) **stimulation** activities.

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

(a) dust suppression;
(b) construction and operational purposes for the petroleum activity authorised by this environmental authority; and
(c) irrigation.

(C10) Produced water irrigated to land must:
(a) not exceed the release limits specified in *Schedule C, Table 1a— Irrigation water quality monitoring*; and
(b) be monitored at the frequency and for the quality characteristics at the monitoring point specified in *Schedule C, Table 1a - Irrigation water quality monitoring*; or
(c) the process under (C11) has been completed.

(C11) Produced water for irrigation which does not meet criteria in condition (C10) (a) and (b) may be used for irrigation provided a report has been completed which:
(a) determines soil structure, stability and productive capacity will be maintained or improved;
(b) determines there are no toxic effects to crops;
(c) determines yields and produce quality are maintained or improved;
(d) states water quality criteria, which has been determined in accordance with the assessment procedures outlined in *Schedule C, Table 1b—Assessment procedures for water quality criteria*; and
(e) includes a water monitoring program to ensure that condition (C11) (a)(b) and (c) are being achieved.

Schedule C, Table 1a— Irrigation water quality monitoring

Quality Characteristic	Release Limit	Limit Type	Frequency	Monitoring Point
Electrical conductivity (EC)	<950us/cm3	95th percentile over a one-year period	Fortnightly	At a location following final treatment and prior to release.
Sodium adsorption ratio (SAR) for heavy soils	≤6			
SAR for light soils	≤12			
pH	6.0-8.5			
Aluminium	20mg/L	Maximum	Bi-annually	
Arsenic	2.0mg/L			
Boron	Refer to table 9.2.18 of ANZECC	Refer to Table 9.2.18 of ANZECC		
Cadmium	0.05mg/L	Maximum		
Chromium	1mg/L			
Cobalt	0.1mg/L			
Copper	5mg/L			
Fluoride	2mg/L			
Iron	10mg/L			
Lithium	2.5 mg/L			
Lead	5 mg/L			
Manganese	10 mg/L			
Mercury	0.002 mg/L			
Molybdenum	0.05mg/L			
Nickel	2 mg/L			
Zinc	5 mg/L			

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

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

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

(C13) Produced water may be transferred to a third party to be used for the following purposes, subject to condition (C14):
- (a) dust suppression;
- (b) construction and operational purposes; or
- (c) domestic or stock purposes provided the water quality complies with criteria specified in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ 2000).

(C14) If the responsibility of produced water is given or transferred to a third party in accordance with condition (C13), the holder of the environmental authority must ensure:
- (a) the responsibility of the produced water is given or transferred in accordance with a written agreement (third party agreement);
- (b) the third party is made aware of the General Environmental Duty under section 319 of the *Environmental Protection Act 1994*.

Sewage treatment works

(C15) Greywater or treated sewage effluent from a treatment system with a daily peak design capacity of up to 100 EP may be:

(a) released to land by sub-surface or spray irrigation provided it is to a fenced and signed contaminant release area that is:
  (i) a minimum distance of 50 metres from any watercourse, wetland or protected area; and
  (ii) a minimum distance of 100 metres from any potable water supply or stock drinking water supply; and
  (iii) kept vegetated with groundcover that is not a declared plant pest species; or
(b) used for dust suppression, construction or operational purposes subject to condition (C17).

(C16) When circumstances prevent the irrigation of treated sewage effluent to land, the contaminants must be directed to on-site storage or lawfully disposed of off-site.

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

(C17) Treated sewage effluent may only be used for dust suppression, construction and operational purposes provided that:
(a) the treated sewage effluent has not been stored in a dam or tank prior to use;
(b) on local government controlled roads, written approval from the relevant Local Government has been given to the holder of this environmental authority; and
(c) the treated sewage effluent quality:
  (i) is monitored at the location and frequency specified in *Schedule C, Table 2 –Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes*; and
  (ii) meets the release limits for each quality characteristic specified in *Schedule C, Table 2 – Treated Sewage Effluent Standards for Dust Suppression, Construction and Operational Purposes*.

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

Quality Characteristic	Sampling and *In situ* Measurement Point Location	Limit type	Release Limit	Frequency
pH	Treated sewage effluent storage	Range	6.0 to 8.5	Weekly[1] until 12 months of monitoring demonstrates no exceedances of the release limits. Monthly monitoring can occur thereafter.
5-day Biochemical Oxygen Demand (BOD)		Median	20 mg/L	
Electrical Conductivity		Maximum	1600 uS/cm	
Turbidity		95%ile (max)	2 (5) NTU	
Total Suspended Solids		Median	5 mg/L	
E. coli		Median	<10 cfu per 100 mL	Weekly

SCHEDULE D – BIODIVERSITY VALUES

Confirming biodiversity values

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

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

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

(D4) All documentation survey information photographs, field data or any material associated with the field validation requirements in (D1) must be maintained for the life of the environmental authority to demonstrate to the administering authority that surveys were conducted in a manner consistent with requirements contained in (D2).

(D5) The location of the petroleum activity must be selected in accordance with the following site planning principles:

(a) maximise the use of **areas of pre-existing disturbance**
(b) in order of preference, avoid, minimise or mitigate any impacts, including cumulative impacts, on areas of native vegetation or other areas of ecological value
(c) minimise disturbance to land that may result in **land degradation**
(d) in order of preference, avoid then minimise isolation, fragmentation, edge effects or dissection of tracts of native vegetation; and
(e) in order of preference, avoid then minimise **clearing** of native mature trees.

Disturbance to land – Environmentally sensitive areas

(D6) Petroleum activities must be carried out in accordance with:

(a) *Schedule D, Table 1 – Authorised Petroleum Activities in Environmentally Sensitive Areas (ESAs);*
(b) *Schedule D, Table 2 – Authorised Maximum Disturbances within Environmentally Sensitive Areas;*
(c) *Schedule D, Table 3 – Authorised Disturbances*; and
(d) any other relevant conditions of this environmental authority.

Schedule D, Table 1 – Authorised Petroleum Activities in Environmentally Sensitive Areas

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Category A ESAs	No petroleum activities permitted	Only **low impact petroleum** activities permitted.	Limited petroleum activities permitted subject to condition (D10) **Limited impact camps** permitted subject to condition (D10) **Limited impact petroleum activities** permitted subject to condition (D10)
Category B ESAs excluding 'Endangered' Regional Ecosystems	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A
Category B ESAs that are 'Endangered' Regional Ecosystems	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Category C ESAs that are Nature Refuges, Koala Habitat and/or Declared Catchment Areas	Only low impact petroleum activities permitted	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to conditions (D7) and (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A
Category C ESAs that are Essential Habitat, Essential Regrowth Habitat and/or 'Of Concern' Regional Ecosystems	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permitted subject to conditions (D7) and (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A
Category C ESAs that are Regional Parks (Resource Use Area)	Only limited petroleum activities permitted subject to condition (D11)	Limited petroleum activities permitted subject to condition (D10) Limited impact camps permittedsubject to condition (D10) Limited impact petroleum activities permitted subject to condition (D10)	N/A

ESA Category	Within the ESA	Primary protection zone of the ESA	Secondary protection zone of the ESA
Category C ESAs that are State Forests and/or Timber Reserves	Limited petroleum activities permitted subject to condition (D11) Petroleum activities that are extraction activities and screening activities permitted. Limited impact camps permitted. Limited impact petroleum activities permitted subject to conditions (D8) and (D11)	N/A	N/A

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

Schedule D, Table 2 – Authorised Maximum Disturbances within Environmentally Sensitive Areas

ESA	Areas of disturbance (hectares)
Category B ESA	25
Category C ESA	17

Schedule D, Table 3 – Authorised Disturbances

Authorised Activity	Authorised Disturbance Purpose	Disturbance Location (GDA 94)		Maximum Disturbance		Environmentally Sensitive Area
		Latitude	Longitude	Length (m)	Area of Disturbance (ha)	
Raymount Telecommunications	Telecommunication Tower	-26.433247	149.18295	N/A	0.95	Category B ESA - (Endangered RE) Primary Protection Zone
	Access Track	-26.434306 -26.432799	149.182976 149.181074	348	0.65	
	Access Track	-26.432799 -26.431901	149.181074 149.180783	104	0.20	Category B ESA - (Endangered RE)
Bindi Telecommunications	Telecommunication Tower	-26.47507	149.183937	N/A	0.07	Category B ESA - (Endangered RE) Primary Protection Zone
	Laydown Area	-26.47556047	149.1848141	N/A	1.00	
	Access Track to Tower	-26.475257 -26.475154	149.184108 149.184026	15	0.015	
	Access Track to Laydown	-26.475143 -26.475274	149.184252 149.184360	18	0.018	

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

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

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

(D10) **Limited petroleum activities**, limited impact camps, limited impact petroleum activities or authorised activities specified in *Schedule D, Table 3 – Authorised Disturbances* located within a primary protection zone or secondary protection zone of an environmentally sensitive area in accordance with *Schedule E, Table 1 – Petroleum Activities in Environmentally Sensitive Areas* and *Schedule D, Table 3 – Authorised Disturbances* must not negatively affect the adjacent environmentally sensitive area.

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

(a) no reasonable or practicable alternative exists for carrying out the limited petroleum activities within the environmentally sensitive area;
(b) the limited petroleum activities are preferentially located in pre-existing areas of clearing or significant disturbance;
(c) clearance widths for linear infrastructure is minimised to the maximum extent possible, taking into account the following matters:
    (i) safe vehicle movement;
    (ii) drainage devices installed are of a type that is appropriate for the track type and location;
    (iii) erosion and sediment control measures installed are in accordance condition (B2);
    (iv) power line stays have been preferentially located within the pipeline right of way where possible; and
(d) the maximum clearance widths specified in *Schedule D, Table 4 – Authorised Disturbance for Linear Infrastructure* are not exceeded.

Schedule D, Table 4 – Authorised Disturbance for Linear Infrastructure

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

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

(D12) Significant residual impacts to prescribed environmental matters are not authorised under this environmental authority or the *Environmental Offsets Act 2014* unless the impact is specified in *Schedule D, Table 5 – Significant residual impacts to prescribed environmental matters.*

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Schedule D, Table 5 – Significant residual impacts to prescribed environmental matters

Prescribed environmental matter	Location of impact	Total maximum extent of impact (ha)
Regional Ecosystems		
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map – RE 11.3.25	PL1021	0.80*
Regional ecosystems (not within an urban area) within the defined distance from the defining banks of a relevant watercourse on the vegetation management watercourse map – RE 11.7.2	PL1021	0.26*
Endangered regional ecosystem (not within an urban area) - RE 11.9.5	PL1021	2.10*
Of concern regional ecosystem (not within an urban area) - RE 11.9.7	PL1021	5.90*
Of concern regional ecosystem (not within an urban area) - RE 11.9.10	PL1021	17.66*
Protected Wildlife Habitat		
Habitat for an animals that is vulnerable wildlife - South-eastern Long-eared Bat (*Nyctophilus corbeni*)	PL1021	42.86*
Habitat for an animals that is vulnerable wildlife – Greater Glider (*Petauroides Volans*)	PL1021	34.53*
Habitat for an animals that is vulnerable wildlife – Koala (*Phascolarctos cinereus*)	PL1021	34.53*
Habitat for an animals that is vulnerable wildlife - Glossy Black-Cockatoo (*Calyptorhynchus lathami*)	PL1021	5.4 19.96*
Habitat for an animals that is vulnerable wildlife - Painted Honeyeater (*Grantiella picta*)	PL1021	36.83*

Prescribed environmental matter	Location of impact	Total maximum extent of impact (ha)
Habitat for an animals that is vulnerable wildlife - Australian Painted Snipe (*Rostratula australis*)	PL1021	1*
Habitat for an animals that is vulnerable wildlife - Common Death Adder (*Acanthophis antarcticus*)	PL1021	41.86*
Habitat for an animals that is vulnerable wildlife - Collared Delma (*Delma torquata*)	PL1021	42.86*
Habitat for an animals that is vulnerable wildlife - Yakka Skink (*Egernia rugose*)	PL1021	42.06*
Habitat for an animals that is vulnerable wildlife - Dunmall's Snake (*Furina dunmalli*)	PL1021	42.86*
Habitat for an animals that is endangered wildlife - Grey Snake (*Hemiaspis damelii*)	PL1021	3.3*
Habitat for an animals that is vulnerable wildlife - Pale Imperial Hairstreak (*Jalmenus eubulus*)	PL1021	5.4
		19.96*

* Offsets under the *Environmental Offsets Act 2014* are not required. The actual extent of impact will be offset under the *Environment Protection and Biodiversity Conservation Act 1999* Approval 2012/6615.

(D13) Records demonstrating that each impact to a prescribed environmental matter not listed in *Schedule D, Table 5 – Significant Residual Impact on Prescribed Environmental Matters* did not, or is not likely to, result in a significant residual impact to that matter must be:

(a) completed by an appropriately qualified person; and

(b) kept for the life of the environmental authority.

(D14) An environmental offset made in accordance with the Environmental Offsets Act 2014 and Queensland Environmental Offsets Policy, as amended from time to time, must be undertaken for the maximum extent of impact to each prescribed environmental matter authorised in *Schedule D, Table 5 – Significant Residual Impact on Prescribed Environmental Matters* unless otherwise stated.

(D15) Records demonstrating that each impact to a prescribed environmental matter not listed in *Schedule D, Table 5 – Significant residual impacts to prescribed environmental matters* did not, or is not likely to, result in a significant residual impact to that matter must be:

(a) completed by an appropriately qualified person; and
(b) kept for the life of the environmental authority.

SCHEDULE E – WASTE

Brine and salt management

(E1) Following the completion of the petroleum activity(ies), any residual **brine** and / or solid salt present in any dam must be removed and transported to a facility that can lawfully reuse, recycle or dispose of such waste under the *Environmental Protection Act 1994*.

General waste management

(E2) Measures must be implemented so that waste is managed in accordance with the **waste and resource management hierarchy and the waste and resource management principles.**

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

(E4) Unless otherwise authorised by the conditions of this EA to be released to land**, Waste fluids**, other than **flare precipitant** stored in **flare pits**, or **residual drilling material**, or drilling fluids stored in **sumps,** must be contained in either:
(a) an above ground container; or
(b) a structure which contains the wetting front.

(E5) Green waste may be used onsite for either rehabilitation or sediment and erosion control, or both.

(E6) Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the *Forestry Act 1959* and a permit has been obtained under the *Fire and Rescue Service Act 1990.*

Residual Drilling Materials

(E7) If sumps are used to store **residual drilling material** or drilling fluids, they must only be used for the duration of drilling activities.

(E8) 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.

(E9) Records must be kept to demonstrate compliance with condition (E7) and condition (E8).

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SCHEDULE F – NOISE

(F1) Notwithstanding condition (A17), emission of noise from the petroleum activity at levels less than those specified in *Schedule F, Table 1—Noise nuisance limits* are not considered to be environmental nuisance.

Schedule F, Table 1—Noise nuisance limits

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

(F2) If the noise subject to a **valid complaint** is tonal or **impulsive**, the adjustments detailed in *Schedule F, Table 2—Adjustments to be added to noise levels at* ***sensitive receptors*** are to be added to the measured noise level(s) to derive $L_{Aeq,\ adj,\ 15\ min}$.

Schedule F, Table 2—Adjustments to be added to noise levels at sensitive receptors

Noise characteristic	Adjustment to noise
Tonal characteristic is just audible	+ 2 dBA
Tonal characteristic is clearly audible	+ 5 dBA
Impulsive characteristic is detectable	+ 2 to + 5 dBA

(F3) Notwithstanding condition (F1), emission of any low frequency noise must not exceed either (F3(a)) and (F3(b)), or (F3(c)) and (F3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority:

(a) 60 dB(C) measured outside the sensitive receptor; and
(b) the difference between the external A-weighted and C-weighted noise levels is no greater than 20 dB; or
(c) 50 dB(Z) measured inside the sensitive receptor; and
(d) the difference between the internal A-weighted and Z-weighted (**Max $L_{pZ, 15\ min}$**) noise levels is no greater than 15 dB.

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

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

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

SCHEDULE G – AIR

Venting and flaring

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

(a) an automatic ignition system is used, and
(b) a flame is visible at all times while the waste gas is being flared, and
(c) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or
(d) it uses an **enclosed flare.**

Fuel burning and combustion facilities

(G2) A fuel burning or combustion facility is not authorised.

SCHEDULE H – REGULATED STRUCTURES

Assessment of Hazard Category

(H1) The **hazard category** of any structure must be assessed by a **suitably qualified and experienced person** in accordance with the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

(H2) The **hazard assessment** required under condition (H1) must occur in any of the following situations:

(a) prior to the design and **construction** of the structure;
(b) prior to any change in its purpose or its stored contents;
(c) for a structure assessed and **certified** as a high or significant hazard structure, at least biennially after its **construction**;
(d) for an **existing low hazard dam**, by 23 September 2018.

(H3) A hazard assessment report and **certification** must be prepared by a **suitably qualified and experienced person** for any **structure** assessed.

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

(H4) Where an existing structure is for the first time assessed as significant or high, the structure must meet the conditions required for regulated structures under this environmental authority within 12 months of that assessment.

Construction of Low Hazard Dam to Contain Wetting Front

(H5) Where a dam is assessed as low hazard, it must be:

(a) constructed, operated and maintained in accordance with **accepted engineering standards** currently appropriate for the purpose for which the dam is intended to be used; and
(b) designed with a floor and sides made of material that will contain the wetting front and any entrained contaminants within the bounds of the containment system during both its operational life and including any period of decommissioning and **rehabilitation**.

(H6) In the event of early signs of loss of structural or hydrological integrity of a **low hazard dam**:

(a) immediate action to prevent or minimise any actual or potential environmental harm must be taken; and
(b) any findings and actions taken must be reported in writing to the administering authority within 20 business days of that event.

Monitoring of Low Hazard Dams

(H7) The condition of all low hazard dams must be monitored for early signs of loss of structural or hydraulic integrity, based on the advice of a **suitably qualified and experienced person**. The methods of monitoring and frequency of monitoring shall be as assessed by the person who conducts the hazard assessment based on the particular circumstances of each dam.

Design and Construction of a Regulated Structure

(H8) **Construction** of any dam determined to be a **regulated structure** is prohibited until:

(a) a **hazard category** assessment report and **certification** has been submitted to the administering authority;
(b) a **design plan** for the **regulated structure** has been prepared by a **suitably qualified and experienced person**; and
(c) **certification** from a suitable qualified and experienced person for the design and **design plan** and the associated operating procedures in compliance with the relevant conditions of this environmental authority has been received.

(H9) The **design plan** must contain the information prescribed in the *Guideline – Structures which are dams or levees constructed as part of environmentally relevant activities*.

(H10) All regulated structures must be designed by, and constructed under the supervision of a **suitably qualified and experienced person** in accordance with the requirements of the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

(H11) All regulated structures must be constructed in accordance with a **design plan** that has been **certified by a suitably qualified and experienced person** in accordance with the requirements of the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

(H12) **Certification** by a **suitably qualified and experienced person** who supervises the **construction** must be submitted to the administering authority on the completion of **construction** of the **regulated structure**, and state that:

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

(H13) All **regulated structures** must be designed and constructed to prevent:

(a) floodwaters from entering the **regulated structure** from a **watercourse** or drainage line to the **annual exceedance probability** specified for determining **spillway** capacity in the *Manual for*

Assessing Hazard Categories and Hydraulic Performance of Dams, as amended from time to time; and

(b) wall failure due to erosion by floodwaters arising from the **watercourse** or drainage line to the **annual exceedance probability** specified for determining **spillway** capacity in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time; and

(c) overtopping as a result of a flood event of the **annual exceedance probability** specified for determining **spillway** capacity in the *Manual for Assessing Hazard Categories and Hydraulic Performance of Dams*, as amended from time to time.

Operation of a Regulated Structure

(H14) Operation of a **regulated structure** is prohibited unless:

(a) one paper copy and one electronic copy of the **design plan** and **certification**, and a set of 'as constructed' drawings and specifications has been submitted to the administering authority, together with **certification** that the structure:
  (i) has been constructed in accordance with the **design plan**;
  (ii) is capable of delivering the performance stated in the **design plan**; and
  (iii) is compliant with the relevant conditions of this environmental authority;

(b) the conditions of this environmental authority relating to the **construction** of the structure have been met; and

(c) for regulated dams, the details required under this environmental authority have been entered into a Register of Regulated Dams.

Regulated Dam Register

(H15) A register of regulated dams must be established in accordance with the administering authority's *Regulated Dam Register* template, as amended from time to time.

(H16) The information contained in the register of regulated dams must always be current and complete on any given day.

Mandatory Reporting Level

(H17) The **mandatory reporting level** must be marked on each **regulated structure** in such a way that it is clearly visible during routine inspections of each dam.

On becoming aware that the **mandatory reporting level** has been reached, action must be taken to prevent or, if unable to prevent, to minimise any actual or potential environmental harm.

SCHEDULE I – WELL CONSTRUCTION, MAINTENANCE AND STIMULATION ACTIVITIES

Drilling activities

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

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

(I3) Practices and procedures must be in place to detect, as soon as practicable, any fractures that have or may result in the connection of a target gas producing formation and another aquifer as a result of drilling activities.

Stimulation activities

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

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

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

(I7) The internal and external mechanical integrity of the well system prior to and during well stimulation must be ensured such that there is:
(a) no significant leakage in the casing, tubing, or packer; and
(b) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.

(I8) Practices and procedures must be in place to detect, as soon as practicable, any fractures that cause the connection of a target gas producing formation and another aquifer.

Stimulation risk assessment

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

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(I10) The stimulation risk assessment must be carried out for every well to be stimulated prior to stimulation activities being carried out at that well and address issues at a relevant geospatial scale such that changes to features and attributes are adequately described and must include, but not necessarily be limited to:

(a) a process description of the stimulation activity to be applied, including equipment and a comparison to best international practice;
(b) provide details of where, when and how often stimulation is to be undertaken on the tenures covered by this environmental authority;
(c) a geological model of the field to be stimulated including geological names, descriptions and depths of the target gas producing formation(s);
(d) naturally occurring geological faults;
(e) seismic history of the region (e.g. earth tremors, earthquakes);
(f) proximity of overlying and underlying aquifers;
(g) description of the depths that aquifers with environmental values occur, both above and below the target gas producing formation.
(h) identification and proximity of **landholders' active groundwater bores** in the area where stimulation activities are to be carried out;
(i) the environmental values of groundwater in the area;
(j) an assessment of the appropriate limits of reporting for all water quality indicators relevant to stimulation monitoring in order to accurately assess the risks to environmental values of groundwater;
(k) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity;
(l) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers;
(m) a description of the well mechanical integrity testing program;
(n) process control and assessment techniques to be applied for determining extent of stimulation activities (e.g. microseismic measurements, modelling etc);
(o) practices and procedures to ensure that the stimulation activities are designed to be contained within the target gas producing formation;
(p) groundwater **transmissivity**, flow rate, hydraulic conductivity and direction(s) of flow;
(q) a description of the chemicals used in stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation;

(r) a mass balance estimating the concentrations and absolute masses of chemicals that will be reacted, returned to the surface or left in the target gas producing formation subsequent to stimulation;

(s) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation including:

  (i) toxicological and ecotoxicological information of chemicals used;
  (ii) information on the persistence and bioaccumulation potential of the chemicals used;
  (iii) identification of the stimulation fluid chemicals of potential concern derived from the risk assessment;

(t) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in stimulation activities;

(u) if used, identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities

(v) an environmental hazard assessment of leaving stimulation chemicals in the target gas producing formation for extended periods subsequent to stimulation;

(w) human health exposure pathways to operators and the regional population;

(x) risk characterisation of environmental impacts based on the environmental hazard assessment;

(y) potential impacts to landholder bores as a result of stimulation activities;

(z) the determination of the likelihood of causing interconnectivity and/or negative water quality as a result of stimulation activities undertaken in close proximity or each other; and

(aa) potential environmental or health impacts which may result from stimulation activities including but not limited to water quality, air quality (including suppression of dust and other airborne contaminants), noise and vibration.

Water Quality Baseline Monitoring

(I11) Prior to undertaking any stimulation activity, a baseline bore assessment must be undertaken of the water quality of:
(a) all landholders' active groundwater bores (subject to access being permitted by the landholder) that are spatially within a two (2) kilometre horizontal radius from the location of the stimulation initiation point within the target gas producing formation; and
(b) all active landholders' groundwater bores (subject to access being permitted by the landholder) in any aquifer that is within 200 metres above or below the target gas producing formation and is spatially located with a two (2) kilometre radius from the location of the stimulation initiation point; and
(c) any other bore that could potentially be adversely impacted by the stimulation activity(ies) in accordance with the findings of the risk assessment required by conditions (I9) and (I10).

(I12) Prior to undertaking stimulation activities at a well, there must have sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include, as a minimum, the results of analyses for the parameters in condition (I13).

(I13) Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to:
(a) pH
(b) electrical conductivity [uS/m]
(c) turbidity [NTU]
(d) total dissolved solids [mg/L]
(e) temperature [ºC]
(f) dissolved oxygen [mg/L]
(g) dissolved gases (methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L]
(h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO3) [mg/L]
(i) sodium adsorption ratio (SAR)
(j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L]
(k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L]
(l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [ug/L]
(m) total petroleum hydrocarbons [ug/L]

(n) **BTEX** (as benzene, toluene, ethylbenzene, ortho-xylene, para- and meta-xylene, and total xylene) [ug/L]
(o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [ug/L]
(p) sodium hypochlorite [mg/L]
(q) sodium hydroxide [mg/L]
(r) formaldehyde [mg/L]
(s) ethanol [mg/L]; and
(t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].

Stimulation Impact Monitoring Program

(I14) A Stimulation Impact Monitoring Program must be developed prior to the carrying out of stimulation activities which must be able to detect adverse impacts to water quality from stimulation activities and must consider the findings of the risk assessment required by conditions (I9) and (I10) that relate to stimulation activities and must include, as a minimum, monitoring of:
(a) the stimulation fluids to be used in stimulation activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used; and
(b) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water; and
(c) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150 per cent of the volume used in stimulation activities has been extracted from the stimulated well; and
(d) all bores in accordance with condition (I11) at the following minimum frequency:

(i) monthly for the first six (6) months subsequent to the stimulation activities being undertaken; then
(ii) annually for the first five (5) years subsequent to the stimulation activities being undertaken or until analytes and physico-chemical parameters listed in condition (I13) are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.

(I15) The Stimulation Impact Monitoring Program must provide for monitoring of:
(a) analytes and physico-chemical parameters relevant to baseline bore and well assessments to enable data referencing and comparison including, but not necessarily being limited to the analytes and physico-chemical parameters in condition (I13); and
(b) any other analyte or physico-chemical parameters that will enable detection of adverse water quality impacts and the inter-connection with a non-target aquifer as a result of stimulation activities including chemical compounds that are actually or potentially formed by chemical reactions with each other or coal seam materials during stimulation activities.

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

SCHEDULE J - REHABILITATION

Rehabilitation Planning

(J1) A Rehabilitation Plan must be developed by a suitably qualified person and must include the:
- (a) **rehabilitation** goals; and
- (b) procedures to be undertaken for rehabilitation that will:
  - (i) achieve the requirements of conditions (J7) to (J8) inclusive; and
  - (ii) provide for appropriate monitoring and maintenance.

Transitional Rehabilitation

(J2) **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.

Remaining Dams

(J3) 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.

Pipeline Activities

(J4) Pipeline trenches must be backfilled and **topsoils** reinstated within three **months** after pipe laying.

(J5) **Reinstatement** and **revegetation** of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction

(J6) Backfilled, reinstated and revegetated pipeline trenches and right of ways must be:
(a) a **stable** landform
(b) re-profiled to a level consistent with surrounding soils
(c) re-profiled to original contours and established drainage lines; and
(d) vegetated with groundcover which is not a declared plant pest species, and which is established and **growing**.

Final Rehabilitation Acceptance Criteria

(J7) All significantly disturbed areas caused by petroleum activities which are not being or intended to be utilised by the landholder or overlapping tenure holder, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value **adjacent land use** or the **pre-disturbed land use**:
(a) greater than or equal to 70 per cent of native ground cover **species richness**
(b) greater than or equal to the total per cent ground cover
(c) less than or equal to the per cent species richness of declared plant pest species
(d) where the adjacent land use contains, or the pre-clearing land use contained, one or more regional ecosystem(s), then:
(i) at least one Regional Ecosystem(s) from the same broad vegetation group, as demonstrated by the **predominant species** in the **ecologically dominant layer**, must be present; and
(ii) the Regional Ecosystem present in (J7)(d)(i) must possess an equivalent orhigher conservation value (biodiversity status) than the Regional Ecosystem(s) in either the adjacent land or pre-disturbed land.

Final Rehabilitation Acceptance Criteria in Environmentally Sensitive Areas

(J8) Where significant disturbance to land has occurred in an environmentally sensitive area, the following final rehabilitation criteria as measured against the pre-disturbance biodiversity values assessment (required by conditions (J1) and (J2)) must be met:

(a) greater than or equal to 70% of native ground cover species richness
(b) greater than or equal to the total per cent ground cover
(c) less than or equal to the per cent species richness of 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

(J9) Conditions (J2), (J7) and (J8) continue to apply after this environmental authority has ended or ceased to have effect.

SCHEDULE K – NOTIFICATION

(K1) The administering authority must be notified through the Pollution Hotline as soon as reasonably practicable, but within 48 hours after becoming aware of:

(a) any unauthorised significant disturbance to land; or

(b) any unauthorised release of contaminants greater than:

(i) 200 L of hydrocarbons; or

(ii) 200 L of stimulation additives; or

(iii) 500 L of **stimulation fluids**; or

(iv) 1 000 L of brine; or

(v) 5 000 L of **coal seam gas water**; or

(vi) 10 000 L of sewage effluent;

(vii) 100,000 L of irrigation-quality coal seam gas water, released inside a designated irrigation area authorised by condition (C13)(c).

(c) a potential or actual loss of structural or hydraulic integrity of a dam; or

(d) when the level of the contents of any regulated dam reaches the mandatory reporting level; or

(e) when a regulated dam will not have available storage to meet the design storage allowance on the 1 November of any year; or

(f) any incident where there is a potential or actual loss of **well integrity** (e.g. when the annulus pressure during stimulation increases by more than 3.5 MPa from the pressure immediately preceding stimulation); or

(g) any detection of **restricted stimulation fluids** from stimulation fluid monitoring; or

(h) any analyses result from baseline bore, well or stimulation impact monitoring that exceeds a water quality objective for the protection of an environmental value of that water resource; or

(i) any analyses result from groundwater monitoring that exceeds trigger action investigation levels, if provided in this environmental authority.

(K2) The notification of emergencies or incidents as required by condition (K1) must include but not be limited to the following information:

(a) the environmental authority number and name of the holder;

(b) the tenure type and number where the emergency or incident occurred;

(c) the name and telephone number of the designated contact person;

(d) the location of the emergency or incident (**GDA**94);

(e) the date and time that the emergency or incident occurred;

(f) the date and time the holder of this environmental authority became aware of the emergency or incident;

(g) details of the nature of the event and the circumstances in which it occurred;

(h) the estimated quantity and type of any contaminants involved in the incident;

(i) the actual or potential suspected cause of the emergency or incident;

(j) a description of the land use at the site of the emergency or incident (e.g. grazing, pasture, forest etc.) and/or the name of any relevant waters and other environmentally sensitive features;

(k) a description of the possible impacts from the emergency or incident;

(l) a description of whether stock and/or wildlife were exposed to any contaminants released and measures taken to prevent access for the duration of the emergency or incident;

(m) any sampling conducted or proposed, relevant to the emergency or incident;

(n) landholder details and details of landholder consultation;

(o) immediate actions taken to control the impacts of the emergency or incident and how environmental harm was mitigated at the time of the emergency or incident; and

(p) whether further examination/root cause analysis is required and if so, the expected date by when this examination will be completed and reported to the administering authority.

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(K3) Within 10 business days following the initial notification under conditions (K1) and (K2) unless a longer time is agreed to by the administering authority, a written report must be provided to the administering authority, including the following (where relevant to the emergency or incident):

(a) the root cause of the emergency or incident;
(b) the confirmed quantities and types of any contaminants involved in the incident;
(c) results and interpretation of any analysis of samples taken at the time of the emergency or incident (including the analysis results of any impact monitoring);
(d) a final assessment of the impacts from the emergency or incident including any actual or potential environmental harm that has occurred or may occur in the longer term as a result of the release;
(e) the success or otherwise of actions taken at the time of the incident to prevent or minimise environmental harm;
(f) results and current status of landholder consultation, including commitment to resolve any outstanding issues / concerns; and
(g) actions and / or procedural changes to prevent a recurrence of the emergency or incident.

SCHEDULE L – DEFINITIONS

Note: Terms which are defined for schedules are bolded at the beginning of each schedule and/or within schedule.

"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 Science; or
(c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.

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

"analogue site" means an area of land which contains values and characteristics representative of an area to be rehabilitated prior to disturbance. Such values must encompass land use, topographic, soil, vegetation, vegetation community attributes and other ecological characteristics. Analogue sites can be the pre-disturbed site of interest where significant surveying effort has been undertaken to establish benchmark parameters.

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

"annual exceedance probability or **AEP"** is the probability that *a given rainfall total accumulated over a given duration will be exceeded in any one year.*

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

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

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

Part A In all cases:

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

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

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

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

Parameter	Maximum concentration
Arsenic	20mg/kg
Selenium	5mg/kg
Boron	100mg/kg
Cadmium	3mg/kg
Chromium	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
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*	7mg/kg
Benzene	1mg/kg

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

"associated 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.

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

"Australian Standard 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 per cent of the measurement time period T of not less than 15 minutes, using Fast response.

"bed and banks" for a watercourse or wetland means land over which the water of the watercourse or wetland normally flows or that is normally covered by the water, whether permanently or intermittently; but does not include land adjoining or adjacent to the bed or banks that is from time to time covered by floodwater.

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

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

"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.

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

"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.