

Permit

Environmental Protection Act 1994

Environmental authority EA0002230

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

Environmental authority number: EA0002230

Environmental authority takes effect on 26 March 2021

Environmental authority holder(s)

Name(s)	Registered address
Westside Mungi Pty Limited	Hsbc Level 17 300 Queen St BRISBANE CITY QLD 4000 Australia
Mitsui E&P Australia Pty Limited	Level 22 2 The Esplanade PERTH WA 6000
Harcourt (Queensland) LLC	Level 10, 345 Queen Street BRISBANE CITY QLD 4000 Australia

Environmentally relevant activity and location details

Environmentally relevant activity/activities	Location(s)
Schedule 3 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES Ancillary 62 - Resource recovery and transfer facility operation 1: Operating a facility for receiving and sorting, dismantling, baling or temporarily storing- (c) category 2 regulated waste	PL1049
Non-Scheduled Petroleum Activity Petroleum Lease - PL	PL1048

Additional information for applicants

Environmentally relevant activities

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

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

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

Contaminated land

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

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

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

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

Take effect

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

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

However, if the EA is authorising an activity that requires an additional authorisation (a relevant tenure for a resource activity, a development permit under the *Sustainable Planning Act 2009* or an SDA Approval under the

State Development and Public Works Organisation Act 1971), this EA will not take effect until the additional authorisation has taken effect.

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

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

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

Date issued: 30 March 2021

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Obligations under the *Environmental Protection Act 1994*

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

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

Conditions of environmental authority

This environmental authority consists of the following parts and schedules:

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Part 1- conditions applicable to PL1048

Environmentally relevant activity	Location
Non-Scheduled Petroleum Activity Petroleum Lease - PL	PL1048

SCHEDULE A – GENERAL

Authorised Activities¹

A 1

This environmental authority authorises the carrying out of the following resource activities:

- a) The petroleum activities² and specified relevant activities listed in *General, Table 1 - Authorised Petroleum Activities* to the extent they are carried out in accordance with the activity's corresponding scale and intensity (or both, where applicable); and
- b) Incidental activities³ that are not otherwise specified relevant activities.

General, Table 1 – Authorised Petroleum Activities

Petroleum activities and infrastructure	Scale	
	Total Number of Authorised Petroleum Activities	Intensity (ha)
Well-Pads	26 wells over 13 multi-well pads	2 ha for each multi-well pad
Gas and Water Gathering Pipelines	23 Km	20 m Right-of-Way width
Stimulation of Gas Wells	As Required for Vertical Wells	

¹ Advice statements for the environmental authority:

- a) It is an offence under section 426 of the Act for a person to carry out an environmentally relevant activity unless the person holds, or is acting under, an environmental authority for the activity.
- b) The environmental authority does not authorise a relevant act to occur in carrying out an authorised relevant activity unless a condition of this environmental authority expressly authorises the relevant act to occur.
- c) The environmental authority does not authorise environmental harm unless a condition contained within the authority explicitly authorises that harm. Where there is no condition, the absence of a condition shall not be construed as authorising harm.

² The petroleum activities are authorised petroleum activities for the purposes of the Petroleum and Gas (Production and Safety) Act 2004 and the Petroleum Act 1923.

³ Words underlined are currently defined in **Schedule K – Definitions** and the *Environmental Protection Act 1994* and/or its subordinate legislation.

A 2	This environmental authority does not authorise <u>environmental harm</u> 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 Standards	
A 3 (PESCD ⁴ 1)	All monitoring must be undertaken by a <u>suitably qualified person</u> .
A 4	If requested by the <u>administering authority</u> in relation to investigating a complaint, monitoring must be commenced within 10 business days.
A 5	All laboratory analyses and tests must be undertaken by a laboratory that has <u>NATA accreditation</u> for such analyses and tests.
A 6	Notwithstanding condition (A 5), 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.
A 7	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 <u>waters</u> and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2018 – <i>Environmental Protection (Water) Policy 2009</i> (b) for groundwater, <i>Groundwater Sampling and Analysis – A Field Guide</i> (2009:27 GeoCat #68901) (c) for noise, the <i>Environmental Protection Regulation 2008</i> (d) for air, the <i>Queensland Air Quality Sampling Manual</i> and/or Australian Standard 4323.1:1995 (R2014) <i>Stationary source emissions method 1: Selection of sampling positions</i>, as appropriate for the relevant measurement (e) for soil, the <i>Guidelines for Surveying Soil and Land Resources, 2nd edition</i> (McKenzie et al. 2008), and/or the <i>Australian Soil and Land Survey Handbook, 3rd edition</i> (National Committee on Soil and Terrain, 2009) (f) for dust, <u>Australian Standard AS3580</u>.
Notification	

⁴ Conditions that include 'SC' are an existing approved and published standard condition.

A 8	In addition to the requirements under Chapter 7, Part 1, Division 2 of the <i>Environmental Protection Act 1994</i>, 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 <u>significant disturbance to land</u> (b) potential or actual loss of <u>well integrity</u> (c) when the seepage trigger action response procedure required under condition (G 11(g)) is or should be implemented (d) unauthorised releases of any volume of <u>prescribed contaminants</u> to waters (e) 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 <u>stimulation fluids</u>; or iv. 5 000 L of untreated <u>coal seam gas water</u>; or (f) the use of <u>restricted stimulation fluids</u> (g) groundwater monitoring results from a <u>landholder's active groundwater bore</u> monitored under the <u>stimulation</u> 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 (h) 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	

A 9	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	
A 10 (PESCC 4)	All plant and equipment must be maintained and operated in their proper and effective condition.
A 11	The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable: (a) <u>development wells</u> (b) any chemical storage facility
A 12	Measures to prevent fauna being harmed from entrapment must be implemented during the construction and operation of well infrastructure and pipeline trenches.
Erosion and Sediment Control	

A 13	For activities involving significant disturbance to land, <u>control measures</u> 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 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	
A 14	Petroleum activities must not cause <u>environmental nuisance</u> at a <u>sensitive place</u> , other than where an <u>alternative arrangement</u> is in place.
Documentation	
A 15	A <u>certification</u> 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.
A 16	All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
A 17	All <u>documents</u> required to be developed under this environmental authority must be kept for five years.
A 18	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.

A 19	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.
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SCHEDULE B – WASTE	
General Waste Management	
B 1 (PESCC 24)	Measures must be implemented so that waste is managed in accordance with the <u>waste and resource management hierarchy</u> and the <u>waste and resource management principles</u> .
B 2	Waste, including waste fluids, but excluding waste used in <u>closed-loop systems</u> , must be transported off-site for lawful re-use, remediation, recycling or disposal, unless the waste is specifically authorised by the conditions of this environmental authority to be disposed of or used on site.
B 3	<u>Waste fluids</u> , other than <u>flare precipitant</u> stored in <u>flare pits</u> , or <u>residual drilling material</u> or drilling fluids stored in <u>sumps</u> , must be contained in either: (a) an above ground container; or (b) a <u>structure</u> which contains the wetting front.
B 4	<u>Green waste</u> may be used on-site for either rehabilitation or sediment and erosion control, or both.
B 5	Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the <i>Forestry Act 1959</i> and a permit has been obtained under the <i>Fire and Rescue Service Act 1990</i> .
Pipeline Wastewater	
B 6	<u>Pipeline waste water</u> , may be released to land provided that it: (a) can be demonstrated it meets the <u>acceptable standards for release to land</u> ; and (b) is released in a way that does not result in visible scouring or erosion or pooling or run-off or vegetation die-off.
Authorised Uses of Produced Water for Petroleum Activities	
B 7	<u>Produced water</u> may be re-used in: (a) drilling and well hole activities; or (b) <u>stimulation</u> activities.
B 8	Produced water may be used for dust suppression provided the following criteria are met:

	(a) the amount applied does not exceed the amount required to effectively suppress dust; and (b) the application: i. does not cause on-site ponding or runoff ii. is directly applied to the area being dust suppressed iii. does not harm vegetation surrounding the area being dust suppressed; and iv. does not cause visible salting.
B 9	Produced water may be used for construction purposes provided the use: (a) does not result in negative impacts on the composition and structure of soil or subsoils (b) is not directly or indirectly released to waters (c) does not result in runoff from the construction site; and does not harm vegetation surrounding the construction site.
B 10	If there is any indication that any of the circumstances in condition (B 8)(b)(i) to (B 8)(b)(iv) or (B 9)(a) to (B 9)(d) is occurring the use must cease immediately and the affected area must be remediated without delay.
Residual Drilling Material	
B 11	If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
B 12	Residual drilling material can only be disposed of on-site: (a) by mix-bury-cover method if the residual drilling material meets the <u>approved quality criteria</u>; or if it is certified by a <u>suitably qualified third party</u> as being of acceptable quality for disposal to land by the proposed method and that environmental harm will not result from the proposed disposal.
B 13	Records must be kept to demonstrate compliance with condition (B 11) and (B 12).

SCHEDULE C – NOISE

C 1

Notwithstanding condition (A 14), emission of noise from the petroleum activity(ies) at levels less than those specified in **Protecting acoustic values, Table 1—Noise nuisance limits** are not considered to be environmental nuisance.

Protecting acoustic values, 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

- 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

C 2

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

Protecting acoustic values, 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

C 3

Notwithstanding condition (C 1), emission of any low frequency noise must not exceed either (C 3(a)) and (C 3(b)), or (C 3(c)) and (C 3(d)) in the event of a valid complaint about low frequency noise being made to the administering authority:

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

	(d) the difference between the internal A-weighted and Z-weighted (<u>Max $L_{pZ, 15 \text{ min}}$</u>) noise levels is no greater than 15 dB.
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SCHEDULE D – AIR	
Venting and Flaring	
D 1	Unless venting is authorised under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> or the <i>Petroleum Act 1923</i>, waste gas must be flared in a manner that complies with all of (D 1(a)) and (D 1(b)) and (D 1(c)), or with (D 1(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 <u>enclosed flare</u>.

SCHEDULE E – LAND	
General	
E 1	Contaminants must not be directly or indirectly released to land.
Top Soil Management	
E 2	<u>Top soil</u> must be managed in a manner that preserves its biological and chemical properties.
Land Management	
E 3	Land that has been significantly disturbed by the petroleum activities must be managed to ensure that mass movement, gully erosion, rill erosion, sheet erosion and tunnel erosion do not occur on that land.
Chemical Storage	
E 4	Chemicals and fuels stored, must be effectively contained and where relevant, meet Australian Standards, where such a standard is applicable.
Pipeline Operation and Maintenance	
E 5	Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the APIA Code of Environmental Practice: Onshore Pipelines - Revision 4 (2017).
Pipeline Reinstatement and Revegetation	
E 6 (PPSCE 17)	Pipeline trenches must be backfilled and topsoils <u>reinstated</u> within three <u>months</u> after pipe laying.
E 7	<u>Reinstatement</u> and <u>revegetation</u> of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
E 8	Backfilled, reinstated and revegetated pipeline trenches and right of ways must be: (a) a <u>stable</u> 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 <u>prohibited or restricted pest species</u>, and which is established and growing.
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SCHEDULE F – BIODIVERSITY	
Confirming Biodiversity Values	
F 1	Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground <u>biodiversity values</u> of the native vegetation communities at that location must be undertaken by a suitably qualified person.
F 2	A suitably qualified person must develop and certify a methodology so that condition (F 1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.
F 3	For conditions (F 4) to (F 6), where mapped biodiversity values differ from those confirmed under conditions (F 1) and (F 2), 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	
F 4	The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles: (a) maximise the use of <u>areas of pre-existing disturbance</u> (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 <u>land degradation</u> (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 <u>clearing</u> of native mature trees.
Planning for Land Disturbance—Linear Infrastructure	
F 5	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 <u>essential petroleum activity</u> authorised in an <u>environmentally sensitive area</u> or its <u>protection zone</u>, be no greater than 40m in total width.

Authorised Disturbance to Environmentally Sensitive Areas			
F 6	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 Protection of Biodiversity Values, Table 1—Authorised petroleum activities in environmentally sensitive areas and their protection zones.		
	Protecting biodiversity values, Table 1—Authorised petroleum activities in environmentally sensitive areas and their protection zones		
	Environmentally sensitive area	Within the environmentally sensitive area	<u>Primary protection zone of the environmentally sensitive area</u>
			<u>Secondary protection zone of the environmentally sensitive area</u>
	Category A environmentally sensitive areas	No petroleum activities permitted.	Only low impact petroleum activities permitted.
	Category B environmentally sensitive areas that are other than 'endangered' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
	Category B environmentally sensitive areas that are 'endangered' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
	Category C environmentally sensitive areas that are 'nature refuges' or 'koala habitat'	Only low impact petroleum activities permitted.	Only low impact petroleum activities permitted.
	Category C environmentally sensitive areas that are 'essential habitat', 'essential regrowth habitat', or 'of concern' regional ecosystems	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.
	Category C environmentally sensitive areas that are 'regional parks' (previously known as 'resources reserves')	Only essential petroleum activities permitted.	Only essential petroleum activities permitted.
	Category C environmentally sensitive areas that are 'state forests' or 'timber reserves'	Only essential petroleum activities permitted.	Petroleum activities permitted.

	Areas of vegetation that are 'critically limited'	Only low impact petroleum activities permitted.	Only essential petroleum activities permitted.	
Impacts to Prescribed Environmental Matters				
F 7	<u>Significant residual impacts to prescribed environmental matters</u> are not authorised under this environmental authority or the <i>Environmental Offsets Act 2014</i> .			
F 8	Records demonstrating that each impact to a prescribed environmental matter did not, or is not likely to, result in a significant residual impact to that matter must be: (a) completed by an <u>appropriately qualified person</u>; and (b) kept for the life of the environmental authority.			

SCHEDULE G – WATER	
Authorised Impacts to Wetlands	
G 1	The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a <u>wetland</u> .
Authorised Activities in Waters	
G 2	Petroleum activities must not occur in or within 200m of a: (a) <u>wetland of high ecological significance</u> (b) <u>Great Artesian Basin Spring</u> (c) <u>subterranean cave GDE</u> .
G 3	Only construction or maintenance of <u>linear infrastructure</u> is permitted in or within any <u>wetland of other environmental value</u> or in a <u>watercourse</u> .
G 4	The construction or maintenance of linear infrastructure in a wetland of other environmental value must not result in the: (a) clearing of riparian vegetation outside of the minimum area practicable to carry out the works; or (b) ingress of saline water into freshwater aquifers; or (c) draining or filling of the wetland beyond the minimum area practicable to carry out the works.
G 5	After the construction or maintenance works for linear infrastructure in a wetland of other environmental value are completed, the linear 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.

G 6	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 (c) thirdly, in times of flow, providing a <u>bankfull</u> situation is not expected and that flow is maintained.										
G 7	The construction or maintenance of linear infrastructure authorised under condition (G 3) must comply with the water quality limits as specified in Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure. Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure <table><tr><th>Water quality parameters</th><th>Units</th><th>Water quality limits</th></tr><tr><td rowspan="2">Turbidity</td><td rowspan="2">Nephelometric Turbidity Units (NTU)</td><td>For a wetland of other environmental value, 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.</td></tr><tr><td>For a wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.</td></tr><tr><td>Hydrocarbons</td><td>-</td><td>For a wetland of other environmental value, or watercourse, no visible sheen or slick</td></tr></table>	Water quality parameters	Units	Water quality limits	Turbidity	Nephelometric Turbidity Units (NTU)	For a wetland of other environmental value, 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 wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.	Hydrocarbons	-	For a wetland of other environmental value, or watercourse, no visible sheen or slick
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Hydrocarbons	-	For a wetland of other environmental value, or watercourse, no visible sheen or slick									
G 8	Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (G 7).										
Register of Activities in Wetlands and Watercourses											
G 9	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 (<u>GDA94</u>) and watercourse name)										

	(b) estimated flow rate of surface water at the time of the activity (c) duration of works, and (d) results of impact monitoring carried out under condition (G 8).
Seepage Monitoring Program	
G 10	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 within three months of the environmental authority taking effect.
G 11	The seepage monitoring program required by condition (G 10) must include but not necessarily be limited to: (a) identification of the containment facilities for which seepage will be monitored (b) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities (c) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities (d) installation of background seepage monitoring bores where groundwater quality will not have been affected by the petroleum activities authorised under this environmental authority to use as reference sites for determining impacts (e) installation of seepage monitoring bores that: i. are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact) ii. provide for the early detection of negative impacts prior to reaching <u>groundwater dependent ecosystems</u>, 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 (G 11(b)) (g) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (G 11(b)) and (G 11(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 <u>annual return period</u>.
Seepage Monitoring Bore Drill Logs	
G 12	A bore drill log must be completed for each seepage monitoring bore in condition (G 11) 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.

SCHEDULE H - REHABILITATION	
Rehabilitation Planning	
H 1	A Rehabilitation Plan must be developed by a suitably qualified person and must include the: (a) <u>rehabilitation</u> goals; and (b) procedures to be undertaken for rehabilitation that will: i. achieve the requirements of conditions (H 2) to (H 4), inclusive; and ii. provide for appropriate monitoring and maintenance.
Transitional Rehabilitation	
H 2	<u>Significantly disturbed areas</u> that are no longer required for the on-going petroleum activities, must be rehabilitated within 12 months (unless an exceptional circumstance in the area to be rehabilitated (e.g. a flood event) prevents this timeframe being met) and be maintained to meet the following acceptance criteria: (a) contaminated land resulting from petroleum activities is remediated and rehabilitated (b) the areas are: i. non-polluting ii. a stable landform iii. re-profiled to contours consistent with the surrounding landform (c) surface drainage lines are re-established (d) top soil is reinstated; and (e) either: i. groundcover, that is not a prohibited or restricted pest species, is growing; or ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
Final Rehabilitation Acceptance Criteria	

H 3	All significantly disturbed areas caused by petroleum activities which are not <u>being or intended to be utilised by the landholder or overlapping tenure holder</u>, must be rehabilitated to meet the following final acceptance criteria measured either against the highest ecological value <u>adjacent land use</u> or the <u>pre-disturbed land use</u>: (a) greater than or equal to 70% of native ground cover <u>species richness</u> (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 prohibited or restricted pest species; and (d) where the adjacent land use contains, or the pre-clearing land use contained, one or more <u>regional ecosystem(s)</u>, 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.
Continuing Conditions	
H 4	Conditions (H 2) and (H 3) continue to apply after this environmental authority has ended or ceased to have effect.

SCHEDULE I - WELL CONSTRUCTION, MAINTENANCE AND STIMULATION ACTIVITIES	
Drilling Activities	
I 1	Oil based or <u>synthetic based drilling muds</u> must not be used in the carrying out of the petroleum activity(ies).
I 2	Drilling activities must not result in the connection of the target gas producing formation and another aquifer.
I 3	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	
I 4	Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the <u>reporting limit</u> .
I 5	Stimulation activities must not negatively affect water quality, other than that within the <u>stimulation impact zone</u> of the target gas producing formation.
I 6	Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.
I 7	The internal and external mechanical integrity of the well system prior to and during stimulation must be ensured such that there is: (a) no significant leakage in the casing, tubing, or packer; and (b) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.
I 8	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	
I 9	Prior to undertaking stimulation activities, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.

I 10	The stimulation risk assessment must be carried out for every well to be stimulated prior to stimulation 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 <u>landholder' active groundwater bores</u> 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 <u>transmissivity</u>, flow rate, hydraulic conductivity and direction(s) of flow (q) a description of the chemical compounds used in stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation
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	(r) a mass balance estimating the concentrations and absolute masses of chemical compounds that will be reacted, returned to the surface or left in the target gas producing formation subsequent to stimulation (s) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation including: i. toxicological and ecotoxicological information of chemical compounds used ii. information on the persistence and bioaccumulation potential of the chemical compounds used; and iii. identification of the chemicals of potential concern in stimulation fluids derived from the risk assessment (t) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in stimulation activities (u) identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities (v) an environmental hazard assessment of leaving chemical compounds in stimulation fluids in the target gas producing formation for extended periods subsequent to stimulation (w) human health exposure pathways to operators and the regional population (x) risk characterisation of environmental impacts based on the environmental hazard assessment (y) potential impacts to landholder bores as a result of stimulation activities (z) an assessment of cumulative underground impacts, spatially and temporally of the stimulation activities to be carried out on the tenures covered by this environmental authority; 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	

I 11	Prior to undertaking any stimulation activity, a baseline bore assessment must be undertaken of the water quality of: (a) all landholder's active groundwater bores (subject to access being permitted by the landholder) that are spatially located within a two (2) kilometre horizontal radius from the location of the stimulation initiation point within the target gas producing formation; and (b) all landholders' active groundwater bores (subject to access being permitted by the landholder) in any aquifer that is within 200m 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 activities in accordance with the findings of the risk assessment required by conditions (I 9) and (I 10).
I 12	Prior to undertaking stimulation activities at a well, there must be sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include as a minimum the results of analyses for the parameters in condition (I 13).
Water Quality Baseline Monitoring	

I 13	Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to: (a) pH (b) electrical conductivity [$\mu\text{S/m}$] (c) turbidity [NTU] (d) total dissolved solids [mg/L] (e) temperature [$^{\circ}\text{C}$] (f) dissolved oxygen [mg/L] (g) dissolved gases (methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L] (h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L] (i) sodium adsorption ratio (SAR) (j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L] (k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L] (l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [$\mu\text{g/L}$] (m) total petroleum hydrocarbons [$\mu\text{g/L}$] (n) <u>BTEX</u> (as benzene, toluene, ethylbenzene, ortho-xylene, para- and meta-xylene, and total xylene) [$\mu\text{g/L}$] (o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [$\mu\text{g/L}$] (p) sodium hypochlorite [mg/L] (q) sodium hydroxide [mg/L] (r) formaldehyde [mg/L] (s) ethanol [mg/L]; and (t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].
Stimulation Impact Monitoring Program	

I 14	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 (I 9) and (I 10) 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 (b) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water (c) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150% of the volume used in stimulation activities has been extracted from the stimulated well; and (d) all bores in accordance with condition (I 11).
I 15	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 (I 13); 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.
I 16	The stimulation impact monitoring program must provide for monitoring of the bores in condition (I 14(d)) 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 being undertaken or until analytes and physico-chemical parameters listed in conditions (I 13(a)) to (I 13(t)) inclusive, are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.
I 17	The results of the stimulation impact monitoring program must be made available to any potentially affected landholder upon request by that landholder.

SCHEDULE J- DEFINITIONS

Key terms and/or phrases underlined in this environmental authority are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Term	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: (a) electrical conductivity (EC) not exceeding 3000µS/cm (b) sodium adsorption ratio (SAR) not exceeding 8 (c) pH between 6.0 and 9.0 (d) heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (e) does not contain biocides.
adjacent land use(s)	means the <u>ecosystem function</u> 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 <i>Environmental Protection Act 1994</i>—the local government; or (b) for all other matters—the Chief Executive of the Department of Environment and Heritage Protection; or (c) another State Government Department, Authority, Storage Operator, Board or Trust, whose role is to administer provisions under other enacted legislation.
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(s)	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.																								
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 <u>exploration well</u> .																								
appropriately qualified person / suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.																								
approved quality criteria	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: <u>Part A</u> In all cases: <table border="1"> <thead> <tr> <th>Parameter</th><th>Maximum concentration</th></tr> </thead> <tbody> <tr> <td>pH</td><td>6–10.5 (range)</td></tr> <tr> <td>Electrical Conductivity</td><td>20dS/m (20,000µS/cm)</td></tr> <tr> <td>Chloride*</td><td>8000mg/L</td></tr> </tbody> </table> *Chloride analysis is only required if an additive containing chloride was used in the drilling process The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing. <u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal: <table border="1"> <thead> <tr> <th>Parameter</th><th>Maximum concentration</th></tr> </thead> <tbody> <tr> <td>Arsenic</td><td>20mg/kg</td></tr> <tr> <td>Selenium</td><td>5mg/kg</td></tr> <tr> <td>Boron</td><td>100mg/kg</td></tr> <tr> <td>Cadmium</td><td>3mg/kg</td></tr> <tr> <td>Chromium (total)</td><td>400mg/kg</td></tr> <tr> <td>Copper</td><td>100mg/kg</td></tr> <tr> <td>Lead</td><td>600mg/kg</td></tr> </tbody> </table> The limits in Part B and Part C refer to the post soil/by-product mix. <u>Part C</u> If a hydrocarbon sheen is visible, the following hydrocarbon fractions:	Parameter	Maximum concentration	pH	6–10.5 (range)	Electrical Conductivity	20dS/m (20,000µS/cm)	Chloride*	8000mg/L	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg	Boron	100mg/kg	Cadmium	3mg/kg	Chromium (total)	400mg/kg	Copper	100mg/kg	Lead	600mg/kg
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	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
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.	
associated works	in relation to a <u>dam</u> , means: (a) operations of any kind and all things constructed, erected or installed for that dam; and (b) any land used for those operations.	
Australian Standard 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.
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% of the measurement time period T of not less than 15 minutes (or $L_{A90,adj,15 mins}$), using Fast response.
bankfull	means the channel flow rate that exists when the water is at the elevation of the channel bank above which water begins to spill out onto the floodplain. The term describes the condition of the channel relative to its banks (e.g. overbank, in-bank, bankfull, low banks, high bank).
bed	of any waters, has the meaning in Schedule 12 of the <i>Environmental Protection Regulation 2008</i> 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	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.
biodiversity values	for the purposes of this environmental authority, means environmentally sensitive areas, prescribed environmental matters and wetlands.
BTEX	means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.
Category A Environmentally Sensitive Area	means any area listed in Schedule 12, Section 1 of the <i>Environmental Protection Regulation 2008</i> .
Category B Environmentally Sensitive Area	means any area listed in Schedule 12, Section 2 of the <i>Environmental Protection Regulation 2008</i> .
Category C Environmentally Sensitive Area	means any of the following areas: nature refuges as defined in the conservation agreement for that refuge under the <i>Nature Conservation Act 1992</i>

	- koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 - state forests or timber reserves as defined under the <i>Forestry Act 1959</i> - regional parks (previously known as resource reserves) under the <i>Nature Conservation Act 1992</i> - an area validated as 'essential habitat' from ground-truthing surveys in accordance with the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered or vulnerable under the <i>Nature Conservation Act 1992</i> 'of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.
certified or certification	means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating: - the person's qualifications and experience relevant to the function - that the person has not knowingly included false, misleading or incomplete information in the document - that the person has not knowingly failed to reveal any relevant information or document to the administering authority - that the document addresses the relevant matters for the function and is factually correct; and - that the opinions expressed in the document are honestly and reasonably held.
clearing	has the meaning in the dictionary of the <i>Vegetation Management Act 2000</i> and for vegetation— (a) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but (b) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
control measure	has the meaning in section 47 of the <i>Environmental Protection Regulation 2008</i> and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.

dam(s)	means a land-based structure or a <u>void</u> that contains, diverts or controls <u>flowable substances</u> , and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and <u>associated works</u> .
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an <u>appraisal well</u> .
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: • any paper or other material on which there is writing; and • any paper or other material on which there are marks; and • figures, symbols or perforations having a meaning for a person qualified to interpret them; and • any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).
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 <i>Environmental Protection Act 1994</i> 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 <i>Environmental Protection Act 1994</i> 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)
essential petroleum activities	means activities that are essential to bringing the resource to the surface and are only the following: • <u>low impact</u> 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 ○ 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, produced 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).
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.
flare pit	has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.
flare precipitant	means waste fluids which result from the operation of a flare.
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.
GDA	means Geocentric Datum of Australia.
Great Artesian Basin (GAB) spring	means an area protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 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. <i>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.</i> <i>Note: The GAB springs dataset can be requested from the Queensland Government Herbarium</i>
green waste	means waste that is grass cuttings, trees, bushes, shrubs, material lopped from trees, untreated timber or other waste that is similar in nature but does not include declared pest species.
groundwater 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 dependent ecosystems do not include those mapped as "unknown".
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.
hydraulic integrity	refers to the capacity of a dam to contain or safely pass <u>flowable substances</u> based on its design.
impulsive (for noise)	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
incidental activity	for this environmental authority means an activity that is not a specified relevant activity and is necessary to carry out the activities listed in <i>Schedule A, Table 1 – Authorised Petroleum Activities</i> .
$L_{A\ 90}$, adj, 15 mins	means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.
L_{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.
land degradation	has the meaning in the <i>Vegetation Management Act 1999</i> 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.
landholder's active groundwater bore	means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the <i>Water Act 2000</i> .
linear infrastructure	means powerlines, pipelines, flowlines, roads and access tracks.
liquid	means a substance which is flowing and offers no permanent resistance to changes of shape.
long term noise event	means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not classified as high or significant as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, published by the administering authority, as amended from time to time.
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.
Map of referable wetlands	has the meaning in Schedule 12 of the <i>Environmental Protection Regulation 2008</i> 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 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.

Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
maximum extent of impact	means the total, cumulative, residual extent and duration of impact to a prescribed environmental matter that will occur over a project's life after all reasonable avoidance and reasonable on-site mitigation measures have been, or will be, undertaken.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
methodology	means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material ($k_w=10-8\text{m/s}$) 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 <i>Acts Interpretation Act 1954</i> 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.

prescribed contaminants	has the meaning in section 440ZD of the <i>Environmental Protection Act 1994</i> and means: (a) earth; or (b) a contaminant prescribed under section 440ZF of the <i>Environmental Protection Act 1994</i> .
prescribed environmental matters	has the meaning in section 10 of the <i>Environmental Offsets Act 2014</i> , limited to the matters of State environmental significant listed in schedule 2 of the Environmental Offsets Regulation 2014.
Prohibited or restricted pest species	means any pest that is: (a) a plant or animal, other than a native species of plant or animal, that is (i) invasive biosecurity matter under the Biosecurity Act 2014 (Qld); or Notes— 1 See the Biosecurity Act 2014, schedule 1, part 3 or 4 or schedule 2, part 2; and 2 See the note to the Biosecurity Act 2014, schedules 1 and 2. (ii) controlled biosecurity matter or regulated biosecurity matter under the Biosecurity Act 2014 (Qld) (iii) tramp ants listed in schedule 1 and schedule 2 of the Biosecurity Act 2014 (Qld) (b) a pest declared under a local law by the local government for the Land to be a pest because the pest is causing, or has the potential to cause, an adverse environmental, economic or social impact in all or part of the local government area.
pipeline waste water	means hydrostatic testing water, flush water or water from low point drains.
pre-disturbed land use	means the function or use of the land as documented prior to significant disturbance occurring at that location.
prescribed contaminants	has the meaning in section 440ZD of the <i>Environmental Protection Act 1994</i> and means:
primary protection zone	means an area within 200m from the boundary of any Category A, B or C ESA.

produced water	has the meaning in Section 15A of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> and means CSG water or <u>associated water</u> for a petroleum tenure.
protection zone	means the primary protection zone of any Category A, B or C ESA or the <u>secondary protection zone</u> of any Category A or B ESA.
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.
rehabilitation or rehabilitated	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and <u>restoration</u> .
reinstate or reinstatement	for pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface typography, watercourses, culverts, fences and gates and other landscape(d) features) and is detailed in the Australian Pipeline Industry Association (APIA) Code of Environmental Practice: Onshore Pipelines Revision 4 (2017).
reporting limit	means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as “less than” the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L–0.02 ug/L.
residual drilling material	means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
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 <u>analogue site</u> . For the purposes of pipelines, restoration applies to final rehabilitation after pipeline decommissioning.

restricted stimulation fluids	has the meaning in section 206 of the <i>Environmental Protection Act 1994</i> and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— (a) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene (b) chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.
revegetation or revegetating or revegetate	means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.
secondary protection zone	in relation to a Category A or Category B ESA means an area within 100 metres from the boundary of the primary protection zone.
sensitive place	means: • a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel) • a library, childcare centre, kindergarten, school, university or other educational institution • a medical centre, surgery or hospital • a protected area • a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment • a work place used as an office or for business or commercial purposes, which is not part of the petroleum activity(ies) and does not include employees accommodation or public roads • for noise, a place defined as a sensitive receptor for the purposes of the Environmental Protection (Noise) Policy 2008.
sensitive receptor	is defined in Schedule 2 of the Environmental Protection (Noise) Policy 2008, and means an area or place where noise is measured.
short term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than eight hours and does not re-occur for a period of at least seven (7) days. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a different source or source location.

significant residual impact	has the meaning in section 8 <i>Environmental Offsets Act 2014</i> .
significantly disturbed or significant disturbance or significant disturbance to land or areas	has the meaning in Schedule 12, section 4 of the <i>Environmental Protection Regulation 2008</i> . Land is significantly disturbed if— (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.
species richness	means the number of different species in a given area.
stable	has the meaning in Schedule 5 of the <i>Environmental Protection Regulation 2008</i> 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 natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. It includes hydraulic fracturing / hydrofracturing, fracture acidizing and the use of proppant treatments. Explanatory note: This definition is restricted from that in the <i>Petroleum and Gas (Production and Safety) Act 2004</i> in order to only capture the types of stimulation activities that pose a risk to environmental values of water quality in aquifers.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.
stimulation impact zone	means a 100m maximum radial distance from the stimulation target location within a gas producing formation.
structure	means a dam or levee.
subterranean cave GDE	- means an area identified as a subterranean cave in the mapping produced by the Queensland Government and identified in the Queensland Government Information System, as amended from time to time; and - means a cave ecosystem which requires access to groundwater on a permanent or intermittent 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 WetlandsInfo mapping program, as amended from time to time. <i>Note: the Subterranean GDE (caves) dataset can be displayed through the Queensland Government WetlandsInfo mapping program.</i> <i>Note: the Subterranean GDE (caves) dataset can be obtained from the Queensland Government Information System.</i>
suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using 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 <i>Environmental Protection Regulation 2008</i>; and (c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.
sump	means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.
synthetic based 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.
top soil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
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 all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.

void	means any constructed, open excavation in the ground.
waste and resource management hierarchy	has the meaning provided in section 9 of the <i>Waste Reduction and Recycling Act 2011</i> and is the following precepts, listed in the preferred order in which waste and resource management options should be considered— (a) AVOID unnecessary resource consumption (b) REDUCE waste generation and disposal (c) RE-USE waste resources without further manufacturing (d) RECYCLE waste resources to make the same or different products (e) RECOVER waste resources, including the recovery of energy (f) TREAT waste before disposal, including reducing the hazardous nature of waste (g) DISPOSE of waste only if there is no viable alternative.
waste and resource management principles	has the meaning provided in section 4(2)(b) of the <i>Waste Reduction and Recycling Act 2011</i> and means the: (a) polluter pays principle (b) user pays principle (c) proximity principle (d) product stewardship principle.
waste fluids	has the meaning in section 13 of the <i>Environmental Protection Act 1994</i> in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the <i>Environmental Protection Act 1994</i> and means: 1) a river, creek or stream in which water flows permanently or intermittently— (a) in a natural channel, whether artificially improved or not; or (b) in an artificial channel that has changed the course of the watercourse. 2) Watercourse includes the <u>bed</u> 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

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	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 integrity	the ability of a well to contain the substances flowing through it.
wetland	for the purpose of this environmental authority, wetland means: ▪ areas shown on the Map of referable wetlands which is a document approved by the chief executive on 4 November 2011 and published by the department, as amended from time to time by the chief executive under section 144D of the Environmental Protection Regulation 2008; and ▪ areas defined under the Queensland Wetlands Program as permanent or periodic / intermittent inundation, with water that is static or flowing fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six (6) metres, and possess one or more of the following attributes: ○ at least periodically, the land supports plants or animals that are adapted to and dependent on living in wet conditions for at least part of their life cycle, or ○ the substratum is predominantly undrained soils that are saturated, flooded or ponded long enough to develop anaerobic conditions in the upper layers, or ○ the substratum is not soil and is saturated with water, or covered by water at some time. The term wetland includes riverine, lacustrine, estuarine, marine and palustrine wetlands; and it does not include a Great Artesian Basin Spring or a subterranean wetland that is a cave or aquifer
wetland of high ecological significance	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'high ecological significance' or wetland of 'high ecological value' on the Map of referable wetlands.
wetland of other environmental value	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'general environmental significance' or wetland of 'other environmental value' on the Map of referable wetlands.

Part 2- conditions applicable to PL1049

Environmentally relevant activities	Location
Schedule 3 08: A petroleum or GHG storage activity, other than items 1 to 7, that includes an activity from Schedule 2 with an AES	1049
Resource activity, ancillary 62(1)(c) Resource recovery and transfer facility operations	1049

Conditions of environmental authority

SCHEDULE A – GENERAL

Authorised Resource Activities

(A1)

This environmental authority⁵ authorises the carrying out of the following resource activities:

a) the petroleum activities and specified relevant activities listed in *Schedule A, General, Table 1—Authorised Resource Activities* to the extent they are carried out in accordance with the activity’s corresponding scale or intensity or both (where applicable); and

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

(A2)

The authorised resource activities area authorised subject to the conditions of this environmental authority.

Schedule A, General, Table 1-Authorised Resource Activities

Authorised Resource Activities	Scale		Intensity (Maximum)
	Maximum size	Location	
Petroleum activities			
Coal seam gas exploration and production	Within PL1049	PL1049	375 well heads

⁵ This environmental authority does not authorise a relevant act to occur in carrying out an authorised resource activity unless a condition expressly authorises that relevant act to occur. Where there is no condition, the lack of a condition must not be construed as authorising the relevant act.

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	Operating fuel burning equipment (permanent, in isolation or combined in operation, or interconnected) capable of burning more than 500kg/hr	6 Compressors	PL1049	60TJ/day
	Specified relevant activities			
	Stimulation activities	Nil	PL1049	375 well heads
(A3)	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 must not be construed as authorising harm.			
Monitoring Standards				
(A4)	All monitoring must be undertaken by a <u>suitably qualified person</u> .			
(A5)	If requested by the <u>administering authority</u> in relation to investigating a complaint, monitoring must be commenced within 10 business days.			
(A6)	All laboratory analyses and tests must be undertaken by a laboratory that has <u>NATA accreditation</u> for such analyses and tests.			
(A7)	Notwithstanding condition (A6), where there are no NATA accredited laboratories for a specific analyte or substance, then duplicate samples must be sent to at least two separate laboratories for independent testing or evaluation.			
(A8)	Monitoring and sampling must be carried out in accordance with the requirements of the following documents (as relevant to the sampling being undertaken), as amended from time to time: (g) for <u>waters</u> and aquatic environments, the Queensland Government's Monitoring and Sampling Manual 2009 – <i>Environmental Protection (Water) Policy 2019</i> (h) for groundwater, <i>Groundwater Sampling and Analysis – A Field Guide</i> (2009:27 GeoCat #6890.1) (i) for noise, the <i>Environmental Protection Regulation 2019</i>			

	(j) for air, the <i>Queensland Air Quality Sampling Manual</i> and/or Australian Standard 4323.1:1995 <i>Stationary source emissions method 1: Selection of sampling positions</i>, as appropriate for the relevant measurement (k) for soil, the <i>Guidelines for Surveying Soil and Land Resources</i>, 2nd edition (McKenzie <i>et al.</i> 2008), and/or the <i>Australian Soil and Land Survey Handbook</i>, 3rd edition (National Committee on Soil and Terrain, 2009) (l) for dust, <u>Australian Standard AS3580</u>.
Notification	
(A9)	In addition to the requirements under Chapter 7, Part 1, Division 2 of the <i>Environmental Protection Act 1994</i>, 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: (i) any unauthorised <u>significant disturbance to land</u> (j) potential or actual loss of structural or <u>hydraulic integrity</u> of a <u>dam</u> (k) when the level of the contents of any <u>regulated dam</u> reaches the mandatory reporting level (l) when a regulated dam will not have available storage to meet the <u>design storage allowance</u> on 1 November of any year (m) potential or actual loss of <u>well integrity</u> (n) when the seepage trigger action response procedure required under condition (Water 14(g)) is or should be implemented (o) unauthorised releases of any volume of <u>prescribed contaminants</u> to waters (p) unauthorised releases of volumes of contaminants, in any mixture, to land greater than: v. 200 L of hydrocarbons; or vi. 200 L of stimulation additives; or vii. 500 L of <u>stimulation fluids</u>; or viii. 1 000 L of brine; or ix. 5 000 L of untreated coal seam gas water; or x. 5 000 L of raw sewage; or xi. 10 000 L of treated sewage effluent.

	(q) the use of <u>restricted stimulation fluids</u> (r) groundwater monitoring results from a <u>landholder's active groundwater bore</u> monitored under the <u>stimulation</u> 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 (s) monitoring results where two out of any five consecutive samples do not comply with the relevant limits in the environmental authority.
Contingency Plan for Emergency Events and Environmental Incidents	
(A10)	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: (h) a clear definition of what constitutes an environmental emergency incident or near miss for the petroleum activity. (i) consideration of the risks caused by the petroleum activity including the impact of flooding and other natural events on the petroleum activity. (j) response procedures to be implemented to prevent or minimise the risks of environmental harm occurring. (k) the practices and procedures to be employed to restore the environment or mitigate any environmental harm caused. (l) procedures to investigate causes and impacts including impact monitoring programs for releases to waters and/or land. (m) training of staff to enable them to effectively respond. (n) procedures to notify the administering authority, local government and any potentially impacted landholder.
Maintenance of plant and equipment	
(A11)	All plant and equipment must be maintained and operated in their proper and effective condition.
(A12)	The following infrastructure must be signed with a unique reference name or number in such a way that it is clearly observable: (c) regulated dams and <u>low consequence dams</u>

	(d) <u>exploration, appraisal and development wells</u> (e) water treatment facilities (f) brine encapsulation facilities (g) landfill cells (h) sewage treatment facilities (i) specifically authorised discharge points to air and waters (j) any chemical storage facility associated with the environmentally relevant activity of chemical storage (k) field compressor stations (l) central compressor stations (m) gas processing facilities; and (n) pipeline compressor stations.
(A13)	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	
(A14)	For activities involving significant disturbance to land, <u>control measures</u> that are commensurate to the site-specific risk of erosion, and risk of sediment release to waters must be implemented to: (f) allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities (g) minimise soil erosion resulting from wind, rain, and flowing water (h) minimise the duration that disturbed soils are exposed to the erosive forces of wind, rain, and flowing water (i) minimise work-related soil erosion and sediment runoff; and (j) minimise negative impacts to land or properties adjacent to the activities (including roads).
(A15)	The control measures required by condition A14 must be in accordance, to the greatest practicable extent, with the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control (BPESC) document and/or the Australian Pipeline Industry

	Association (APIA) Code of Environmental Practice: Onshore Pipelines (2017) as amended from time to time.
Complaints	
(A16)	Petroleum activities must not cause <u>environmental nuisance</u> at a <u>sensitive place</u> , other than where an <u>alternative arrangement</u> is in place.
Documentation	
(A17)	A <u>certification</u> 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: (d) relevant material, including current published guidelines (where available) have been considered in the written document (e) the content of the written document is accurate and true; and (f) the document meets the requirements of the relevant conditions of the environmental authority.
(A18)	All plans, procedures, programs, reports and methodologies required under this environmental authority must be written and implemented.
(A19)	All <u>documents</u> required to be developed under this environmental authority must be kept for five years.
(A20)	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.
(A21)	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.

SCHEDULE B – WASTE MANAGEMENT	
General	
(B1)	Measures must be implemented so that waste is managed in accordance with the <u>waste and resource management hierarchy</u> and the <u>waste and resource management principles</u> .
(B2)	<u>Waste fluids</u>, other than <u>flare precipitant</u> stored in <u>flare pits</u>, or <u>residual drilling material</u> or drilling fluids stored in <u>sumps</u>, must be contained in either: (a) an above ground container; or (b) a <u>structure</u> which contains the wetting front.
(B3)	<u>Green waste</u> may be used on-site for either rehabilitation or sediment and erosion control, or both.
(B4)	Vegetation waste may be burned if it relates to a state forest, timber reserve or forest entitlement area administered by the <i>Forestry Act 1959</i> and a permit has been obtained under the <i>Fire and Rescue Service Act 1990</i> .
Pipeline wastewater	
(B5)	<u>Pipeline waste water</u>, may be released to land provided that it: (a) can be demonstrated it meets the acceptable standards for release to land; and (b) is released in a way that does not result in visible scouring or erosion or pooling or run-off or vegetation die-off.
Authorised uses of produced water for authorised petroleum activities	
(B6)	<u>Produced water</u> may be re-used in: (a) drilling and well hole activities; or (b) <u>stimulation</u> activities.
(B7)	Produced water may be used for dust suppression provided the following criteria are met: (a) the amount applied does not exceed the amount required to effectively suppress dust; and (b) the application:

	i. does not cause on-site ponding or runoff ii. is directly applied to the area being dust suppressed iii. does not harm vegetation surrounding the area being dust suppressed; and iv. does not cause visible salting.
(B8)	Produced water may be used for construction purposes provided the use: (d) does not result in negative impacts on the composition and structure of soil or subsoils (e) is not directly or indirectly released to waters (f) does not result in runoff from the construction site; and (g) does not harm vegetation surrounding the construction site.
(B9)	If there is any indication that any of the circumstances in condition (B7)(b)(i) to (B7)(b)(iv)) or (B8)(a) to (B8)(d)) is occurring the use must cease immediately and the affected area must be remediated without delay.
(B10)	Irrigation of produced water is authorised providing it ensures: (a) Ensure that soil structure, stability and productive capacity can be maintained or improved; (b) Toxic effects to crops do not result; and (c) Yields and produce quality area maintained or improved.
(B11)	Irrigation of produced water is authorised providing a written report is provide to the chief executive which: (a) Certifies that the outcomes in condition (B10) will be achieved (b) States water quality criteria, which has been determined in accordance with the assessment procedures outlines in Waste Schedule, Table 1–Assessment procedures for water quality criteria (c) Includes a water monitoring program to monitor that the outcomes listed in condition (B10) are being achieved. Waste Schedule, Table 1–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 e 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 factions • 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.
Residual drilling material		

(B12)	If sumps are used to store residual drilling material or drilling fluids, they must only be used for the duration of drilling activities.
(B13)	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.
(B14)	Records must be kept to demonstrate compliance with condition (B12) and (B13).

SCHEDULE C – PROTECTING ACOUSTIC VALUES**General**

(C1)

Notwithstanding condition (A18), emission of noise from the petroleum activity(ies) at levels less than those specified in **Protecting acoustic values, Table 1—Noise nuisance limits** are not considered to be environmental nuisance.

Protecting acoustic values, 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	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
	<u>Max L_{pA, 15 mins}</u>	55 dBA	55 dBA	55 dBA
6:00am—7:00am	L _{Aeq,adj,15 min}	40 dBA	38 dBA	35 dBA

Note 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

(C2)

If the noise subject to a valid complaint is tonal or impulsive, the adjustments detailed in **Protecting acoustic values, 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}.

Protecting acoustic values, Table 2—Adjustments to be added to noise levels at sensitive receptors

Noise characteristic	Adjustment to noise
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		Tonal characteristic is just audible	+ 2 dBA
		Tonal characteristic is clearly audible	+ 5 dBA
		Impulsive characteristic is detectable	+ 2 to + 5 dBA
(C3)	Notwithstanding condition (C1), emission of any low frequency noise must not exceed either (C3(a)) and (C3(b)), or (C3(c)) and (C3(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 (<u>Max $L_{pZ, 15 \text{ min}}$</u>) noise levels is no greater than 15 dB.		

SCHEDULE D – PROTECTING AIR VALUES**Fuel Burning or combustion equipment – authorised point source**

(D1)	Unless venting is authorised under the <i>Petroleum and Gas (Production and Safety) Act 2004</i> or the <i>Petroleum Act 1923</i>, waste gas must be flared in a manner that complies with all of (D1(a)) and (D1(b)) and (D1(c)), or with (D1(d)): (e) an automatic ignition system is used, and (f) a flame is visible at all times while the waste gas is being flared, and (g) there are no visible smoke emissions other than for a total period of no more than 5 minutes in any 2 hours, or (h) it uses an <u>enclosed flare</u>.
(D2)	A <u>fuel burning or combustion facility</u> must not be operated unless it is listed in Protecting air values, Table 1—Authorised point sources .
(D3)	If a fuel burning or combustion facility is listed in Protecting air values, Table 1—Authorised point sources , the fuel burning or combustion facility must be operated so that the releases to air do not exceed the limits specified in Protecting air values, Table 1—Authorised point sources at the specified release point reference.

Protecting air values, Table 1—Authorised point sources

Resource Authority	Facility	Release Point Reference	Equipment Description	Minimum Release Height (m)	Minimum Efflux Velocity (m / sec)	NOx as Nitrogen Dioxide		Carbon Monoxide	
						Maximum concentration (mg / Nm ³)	Maximum Mass emission rate (g / sec)	Maximum concentration (mg / Nm ³)	Maximum Mass emission rate (g / sec)
PL1049	MWCH	A1	Compressor 1	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5

PL1049	MWC H	A2	Compresso r 2	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5
PL1049	MWC H	A3	Compresso r 3	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5
PL1049	MWC H	A4	Compresso r 4	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5
PL1049	MWC H	A5	Compresso r 5	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5
PL1049	MWC H	A6	Compresso r 6	8	10	650 @ 5% O ₂	1.7	1500 @ 5% O ₂	3.5
PL1049	MWC H	A7	Generator 1	8	12	450 @ 5% O ₂	3.1	700 @ 5% O ₂	5.0
PL1049	MWC H	A8	Generator 2	8	12	450 @ 5% O ₂	3.1	700 @ 5% O ₂	5.0
PL1049	MWC H	A9	Generator 3	8	12	450 @ 5% O ₂	3.1	700 @ 5% O ₂	5.0
PL1049	MWC H	A10	Generator 4	8	12	450 @ 5% O ₂	3.1	700 @ 5% O ₂	5.0
PL1049	MWC H	A11	Generator 5	8	12	450 @ 5% O ₂	3.1	700 @ 5% O ₂	5.0
PL1049	MWC H	A12	Flare	20	N/A	N/A	N/A	N/A	N/A
(D4)		Point source air monitoring for each fuel burning or combustion facility listed in Protecting air values, Table 1—Authorised point sources must: (a) be undertaken once: - in the first three months after each facility is first commissioned, and then - every year thereafter; (b) be carried out when the facility the subject of the sampling is operating under maximum operating conditions for the annual period; and							

	(c) demonstrate compliance with the limits listed in Protecting air values, Table 1—Authorised point sources at each release point reference.																				
(D5)	The operation of fuel burning or combustion facilities must not result in ground level concentrations of contaminants exceeding the maximum limits specified in Protecting air values, Table 2—Maximum ground level concentration of contaminants to air. Protecting air values, Table 2—Maximum ground level concentration of contaminants to air <table><tr><th>Contaminant</th><th>EPP Air Quality Objective / Maximum ground level concentration at 0° Celsius</th><th>Units</th><th>Averaging time</th></tr><tr><td>Nitrogen Dioxide</td><td>250</td><td>µg/m³</td><td>1 hour</td></tr><tr><td>Nitrogen Dioxide</td><td>62</td><td>µg/m³</td><td>1 year</td></tr><tr><td>Sulphur Dioxide</td><td>570</td><td>µg/m³</td><td>1 hour</td></tr><tr><td>Carbon Monoxide</td><td>11</td><td>mg/ m³</td><td>8 hours</td></tr></table>	Contaminant	EPP Air Quality Objective / Maximum ground level concentration at 0° Celsius	Units	Averaging time	Nitrogen Dioxide	250	µg/m³	1 hour	Nitrogen Dioxide	62	µg/m³	1 year	Sulphur Dioxide	570	µg/m³	1 hour	Carbon Monoxide	11	mg/ m³	8 hours
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(D6)	An air receiving environment monitoring program (AREMP) must be developed to demonstrate compliance with the limits in Protecting Air Values, Table 2—Maximum ground level concentration of contaminants to air .																				
(D7)	The AREMP must include, but not necessarily be limited to: (a) the delineation of the relevant air shed(s); (b) the identification of background reference sites and impact monitoring sites within the relevant air shed(s), including sensitive places; (c) a monitoring program to be carried out annually that: i. includes background reference and impact monitoring sites; ii. includes an assessment of meteorological conditions (wind speed and direction); iii. is sufficient to determine compliance with the limits listed in Protecting Air Values, Table 2—Maximum ground level concentration of contaminants to air																				

	iv. identifies the effects of the authorised contaminants released to air in the relevant air shed(s); v. is representative of when the fuel burning or combustion facilities are operating under maximum operating conditions for the annual period; (d) an assessment of the condition of each fuel burning or combustion facility; and (e) a description of other significant point sources in the air shed and surrounding land use including sensitive places.
(D8)	An AREMP report must be written annually which includes the information required by condition (D7) and an assessment of the extent to which monitoring data for ground level concentrations complies with the air contaminant limits listed in Protecting air values, Table 2—Maximum ground level concentration of contaminants to air .
(D9)	Where monitoring data indicates that ground level concentrations listed in Protecting air values, Table 2—Maximum ground level concentration of contaminants to air have not been met, the AREMP report required by condition (D8) must also include an assessment of: (a) the extent to which the values of the air environment in the relevant air shed(s) are being protected (b) an assessment of whether contaminant releases to the air environment are consistent with the air management hierarchy in the <i>Environmental Protection (Air) Policy 2019</i>, and (c) any corrective actions that have been implemented or proposed to be implemented to become consistent with the air management hierarchy and achieve compliance with Protecting air values, Table 2—Maximum ground level concentration of contaminants to air.
(D10)	A <u>statement of compliance</u> prepared by a suitably qualified person must accompany each AREMP report required by condition (D8) and if applicable, condition (D9) stating: (a) whether the AREMP as most recently implemented complies with the requirements of conditions (A3), condition (A7(d)), (D6) and (D7) (b) that, to the best of the suitably qualified person's knowledge, the assessment required by condition (D8) and if applicable, condition (D9) is true, correct and complete, and

	(c) that, to the best of the suitably qualified person's knowledge, all information provided as part of the statement of compliance, including attachments, is true, correct and complete.
(D11)	Where condition (D9) applies, the documents required by conditions (D8), (D9) and (D10) must be given to the administering authority within 5 business days after the AREMP report is written.

SCHEDULE E – PROTECTING LAND VALUES	
General	
(E1)	Contaminants must not be directly or indirectly released to land.
Top soil management	
(E2)	<u>Top soil</u> must be managed in a manner that preserves its biological and chemical properties.
Chemical Storage	
(E3)	Chemicals and fuels on the relevant tenure must be stored in an effective containment system that meets Australian Standards, where such a standard is relevant.
Pipeline operation and maintenance	
(E4)	Pipeline operation and maintenance must be in accordance, to the greatest practicable extent, with the relevant section of the APIA Code of Environmental Practice: Onshore Pipelines (2017) and amended from time to time.
Pipeline reinstatement and revegetation	
(E5)	Pipeline trenches must be backfilled and topsoils <u>reinstated</u> within three <u>months</u> after pipe laying.
(E6)	<u>Reinstatement</u> and <u>revegetation</u> of the pipeline right of way must commence within 6 months after cessation of petroleum activities for the purpose of pipeline construction.
(E7)	Backfilled, reinstated and revegetated pipeline trenches and right of ways must be: (e) a <u>stable</u> landform (f) re-profiled to a level consistent with surrounding soils (g) re-profiled to original contours and established drainage lines; and (h) vegetated with groundcover which is not a <u>declared pest species</u>, and which is established and growing.

SCHEDULE F – PROTECTING BIODIVERSITY VALUES	
Confirming biodiversity values	
(F1)	Prior to undertaking activities that result in significant disturbance to land in areas of native vegetation, confirmation of on-the-ground <u>biodiversity values</u> of the native vegetation communities at that location must be undertaken by a suitably qualified person.
(F2)	A suitably qualified person must develop and certify a methodology so that condition (F1) can be complied with and which is appropriate to confirm on-the-ground biodiversity values.
(F3)	For conditions (F4) to (F8), where mapped biodiversity values differ from those confirmed under conditions (F1) and (F2), 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	
(F4)	The location of the petroleum activity(ies) must be selected in accordance with the following site planning principles: (a) maximise the use of <u>areas of pre-existing disturbance</u> (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 <u>land degradation</u> (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 <u>clearing</u> of native mature trees.
(F5)	Linear infrastructure construction corridors must: (c) maximise co-location (d) be minimised in width to the greatest practicable extent; and (e) for linear infrastructure that is an <u>essential petroleum activity</u> authorised in an <u>environmentally sensitive area</u> or its <u>protection zone</u>, be no greater than 40m in total width.

(F6)	Petroleum activities are not permitted in <u>Category A</u> , B or C environmentally sensitive areas.
(F7)	Essential petroleum activities may be undertaken in areas of pre-existing disturbance in the primary protection zones of <u>Category B environmentally sensitive areas</u> that are 'endangered' regional ecosystems and <u>Category C environmentally sensitive areas</u> other than 'nature refuges' or 'koala habitat' areas, providing those activities do not have a measurable negative impact on the adjacent environmentally sensitive area.
(F8)	A report must be prepared for each <u>annual return period</u> for all petroleum activities that involved clearing of any environmentally sensitive area or protection zone which includes: (a) records able to demonstrate compliance with conditions (F4) and (F5); (b) a description of the works (c) a description of the area and its pre-disturbance values (which may include maps or photographs, but must include GPS coordinates for the works); and (d) based on the extent of environmentally sensitive areas and primary protection zones on the relevant resource authority(ies), the proportion of native vegetation cleared per environmentally sensitive area and primary protection zone, including regional ecosystem type, over the annual return period.
(F9)	<u>Significant residual impacts</u> to <u>prescribed environmental matters</u> are not authorised under this environmental authority or the <i>Environmental Offsets Act 2014</i> .
(F10)	Records demonstrating that each impact to a prescribed environmental matter did not, or is not likely to, result in a significant residual impact to that matter must be: (c) completed by an <u>appropriately qualified person</u>; and (d) kept for the life of the environmental authority.

SCHEDULE G – PROTECTING WATER VALUES	
Authorised activities in watercourses, wetlands and springs	
G1	The extraction of groundwater as part of the petroleum activity(ies) from underground aquifers must not directly or indirectly cause environmental harm to a <u>wetland</u> .
Authorised activities in waters	
G2	Petroleum activities must not occur in or within 200m of a: (d) <u>wetland of high ecological significance</u> (e) <u>Great Artesian Basin Spring</u> (f) <u>subterranean cave GDE</u> .
G3	Only construction or maintenance of <u>linear infrastructure</u> is permitted in or within any <u>wetland of other environmental value</u> or in a <u>watercourse</u> .
G4	The construction or maintenance of linear infrastructure in a wetland of other environmental value must not result in the: (d) clearing of riparian vegetation outside of the minimum area practicable to carry out the works; or (e) ingress of saline water into freshwater aquifers; or (f) draining or filling of the wetland beyond the minimum area practicable to carry out the works.
G5	After the construction or maintenance works for linear infrastructure in a wetland of other environmental value are completed, the linear infrastructure must not: (g) drain or fill the wetland (h) prohibit the flow of surface water in or out of the wetland (i) lower or raise the water table and hydrostatic pressure outside the bounds of natural variability that existed before the activities commenced (j) result in ongoing negative impacts to water quality (k) result in bank instability; or (l) result in fauna ceasing to use adjacent areas for habitat, feeding, roosting or nesting.

G6	The construction or maintenance of linear infrastructure activities in a watercourse must be conducted in the following preferential order: (d) firstly, in times where there is no water present (e) secondly, in times of no flow (f) thirdly, in times of flow, providing a bankfull situation is not expected and that flow is maintained.											
G7	The construction or maintenance of linear infrastructure authorised under condition (G3) must comply with the water quality limits as specified in Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure. Protecting water values, Table 1—Release limits for construction or maintenance of linear infrastructure <table border="1"> <thead> <tr> <th>Water quality parameters</th><th>Units</th><th>Water quality limits</th></tr> </thead> <tbody> <tr> <td rowspan="2">Turbidity</td><td rowspan="2">Nephelometric Turbidity Units (NTU)</td><td> For a wetland of other environmental value, 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. </td></tr> <tr> <td> For a wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity. </td></tr> <tr> <td>Hydrocarbons</td><td>Nil</td><td>For a wetland of other environmental value, or watercourse, no visible sheen or slick</td></tr> </tbody> </table>		Water quality parameters	Units	Water quality limits	Turbidity	Nephelometric Turbidity Units (NTU)	For a wetland of other environmental value, 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 wetland of other environmental value, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within a 50m radius of the construction or maintenance activity. For a watercourse, if background water turbidity is equal to, or below 45 NTU, a turbidity limit of no greater than 55 NTU applies, measured within 50m downstream of the construction or maintenance activity.	Hydrocarbons	Nil	For a wetland of other environmental value, or watercourse, no visible sheen or slick
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G8	Monitoring must be undertaken at a frequency that is appropriate to demonstrate compliance with condition (G7).
Register of activities in wetlands and watercourses	
G9	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: (e) location of the activity (e.g. GPS coordinates (<u>GDA94</u>) and watercourse name) (f) estimated flow rate of surface water at the time of the activity (g) duration of works, and (h) results of impact monitoring carried out under condition (G8).
Activities in river improvement areas	
G10	Measures must be taken to minimise negative impacts to, or reversal of, any river improvement works carried out in River Improvement Areas by Queensland's River Improvement Trusts.
Activities in river improvement areas	
G11	Petroleum activity(ies) on <u>floodplains</u> must be carried out in a way that does not: (a) concentrate flood flows in a way that will or may cause or threaten a negative 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.
G12	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 1 July 2020.
G13	The seepage monitoring program required by condition (G12) must include but not necessarily be limited to: (j) identification of the containment facilities for which seepage will be monitored

	(k) identification of trigger parameters that are associated with the potential or actual contaminants held in the containment facilities (l) identification of trigger concentration levels that are suitable for early detection of contaminant releases at the containment facilities (m) 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 (n) installation of seepage monitoring bores that: iv. are within formations potentially affected by the containment facilities authorised under this environmental authority (i.e. within the potential area of impact) v. provide for the early detection of negative impacts prior to reaching <u>groundwater dependent ecosystems</u>, landholder's active groundwater bores, or water supply bores vi. 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) (o) monitoring of groundwater at each background and seepage monitoring bore at least quarterly for the trigger parameters identified in condition (G13(b)) (p) seepage trigger action response procedures for when trigger parameters and trigger levels identified in conditions (G13(b)) and (G13(c)) trigger the early detection of seepage, or upon becoming aware of any monitoring results that indicate potential groundwater contamination (q) a rationale detailing the program conceptualisation including assumptions, determinations, monitoring equipment, sampling methods and data analysis; and (r) provides for annual updates to the program for new containment facilities constructed in each annual return period.
G14	A bore drill log must be completed for each seepage monitoring bore in condition (G13) which must include: (f) bore identification reference and geographical coordinate location (g) 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

	(h) standing groundwater level and water quality parameters including physical parameter and results of laboratory analysis for the possible trigger parameters (i) lithological data, preferably a stratigraphic interpretation to identify the important features including the identification of any aquifers; and (j) target formation of the bore.
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SCHEDULE H – REHABILITATION	
Rehabilitation planning	
(H1)	A Rehabilitation Plan must be developed by a suitably qualified person and must include the: (c) <u>rehabilitation</u> goals; and (d) procedures to be undertaken for rehabilitation that will: iii. achieve the requirements of conditions (H2) to (H8), inclusive; and iv. provide for appropriate monitoring and maintenance.
Transitional rehabilitation	
(H2)	<u>Significantly disturbed areas</u> 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: (f) contaminated land resulting from petroleum activities is remediated and rehabilitated (g) the areas are: iv. non-polluting v. a <u>stable</u> landform vi. re-profiled to contours consistent with the surrounding landform (h) surface drainage lines are re-established (i) top soil is reinstated; and (j) either: i. groundcover, that is not a <u>declared pest species</u>, is growing; or ii. an alternative soil stabilisation methodology that achieves effective stabilisation is implemented and maintained.
Final rehabilitation acceptance criteria	
(H3)	All significantly disturbed areas caused by petroleum activities which are not <u>being or intended to be utilised by the landholder or overlapping tenure holder</u>, must be rehabilitated

	to meet the following final acceptance criteria measured either against the highest ecological value <u>adjacent land use</u> or the <u>pre-disturbed land use</u>: (e) greater than or equal to 70% of native ground cover <u>species richness</u> (f) greater than or equal to the total per cent of ground cover (g) less than or equal to the per cent species richness of <u>declared plant pest species</u>; and (h) where the adjacent land use contains, or the pre-clearing land use contained, one or more <u>regional ecosystem(s)</u>, 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	
(H4)	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 (H1) and (H2)) 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 <u>total density of coarse woody material</u>; and (f) all <u>predominant species</u> in the <u>ecologically dominant layer</u>, that define the pre-disturbance regional ecosystem(s) are present.
Continuing conditions	
(H5)	Conditions (H2), (H3) and (H4) continue to apply after this environmental authority has ended or ceased to have effect.
(H6)	Prior to relinquishing all or part of an authority to prospect area, a rehabilitation report must be prepared which specifically relates to the area to be relinquished and demonstrates condition (H2), (H3) and (H4) has been met.

(H7)	The report required under condition (H 6) must be submitted to the administering authority at least 40 business days prior to the relinquishment notice being lodged with the administering authority for the <i>Petroleum and Gas (Production and Safety) Act 2004</i> .
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SCHEDULE I – Well construction, maintenance and stimulation activities	
Drilling activities	
(11)	Oil based or <u>synthetic based drilling muds</u> must not be used in the carrying out of the petroleum activity(ies).
(12)	Drilling activities must not result in the connection of the target gas producing formation and another aquifer.
(13)	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	
(14)	Polycyclic aromatic hydrocarbons or products that contain polycyclic aromatic hydrocarbons must not be used in stimulation fluids in concentrations above the <u>reporting limit</u> .
(15)	Stimulation activities must not negatively affect water quality, other than that within the <u>stimulation impact zone</u> of the target gas producing formation.
(16)	Stimulation activities must not cause the connection of the target gas producing formation and another aquifer.
(17)	The internal and external mechanical integrity of the well system prior to and during stimulation must be ensured such that there is: (c) no significant leakage in the casing, tubing, or packer; and (d) there is no significant fluid movement into another aquifer through vertical channels adjacent to the well bore hole.
(18)	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	
(19)	Prior to undertaking stimulation activities, a risk assessment must be developed to ensure that stimulation activities are managed to prevent environmental harm.

(I10)	A summary of each stimulation risk assessment must be submitted to the administering authority upon request.
(I11)	The stimulation risk assessment must be carried out for every well to be stimulated prior to stimulation 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: (t) a process description of the stimulation activity to be applied, including equipment and a comparison to best international practice (u) provide details of where, when and how often stimulation is to be undertaken on the tenures covered by this environmental authority (v) a geological model of the field to be stimulated including geological names, descriptions and depths of the target gas producing formation(s) (w) naturally occurring geological faults (x) seismic history of the region (e.g. earth tremors, earthquakes) (y) proximity of overlying and underlying aquifers (z) description of the depths that aquifers with environmental values occur, both above and below the target gas producing formation (aa) identification and proximity of <u>landholder' active groundwater bores</u> in the area where stimulation activities are to be carried out (bb) the environmental values of groundwater in the area (cc) 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 (dd) description of overlying and underlying formations in respect of porosity, permeability, hydraulic conductivity, faulting and fracture propensity (ee) consideration of barriers or known direct connections between the target gas producing formation and the overlying and underlying aquifers (ff) a description of the well mechanical integrity testing program (gg) process control and assessment techniques to be applied for determining extent of stimulation activities (e.g. microseismic measurements, modelling etc.) (hh) practices and procedures to ensure that the stimulation activities are designed to be contained within the target gas producing formation

	(ii) groundwater <u>transmissivity</u>, flow rate, hydraulic conductivity and direction(s) of flow (jj) a description of the chemical compounds used in stimulation activities (including estimated total mass, estimated composition, chemical abstract service numbers and properties), their mixtures and the resultant compounds that are formed after stimulation (kk) a mass balance estimating the concentrations and absolute masses of chemical compounds that will be reacted, returned to the surface or left in the target gas producing formation subsequent to stimulation (ll) an environmental hazard assessment of the chemicals used including their mixtures and the resultant chemicals that are formed after stimulation including: iv. toxicological and ecotoxicological information of chemical compounds used v. information on the persistence and bioaccumulation potential of the chemical compounds used; and vi. identification of the chemicals of potential concern in stimulation fluids derived from the risk assessment (t) an environmental hazard assessment of use, formation of, and detection of polycyclic aromatic hydrocarbons in stimulation activities (u) identification and an environmental hazard assessment of using radioactive tracer beads in stimulation activities (v) an environmental hazard assessment of leaving chemical compounds in stimulation fluids in the target gas producing formation for extended periods subsequent to stimulation (w) human health exposure pathways to operators and the regional population (x) risk characterisation of environmental impacts based on the environmental hazard assessment (y) potential impacts to landholder bores as a result of stimulation activities (z) an assessment of cumulative underground impacts, spatially and temporally of the stimulation activities to be carried out on the tenures covered by this environmental authority; 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.
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Water quality baseline monitoring	
(I12)	Prior to undertaking any stimulation activity, a baseline bore assessment must be undertaken of the water quality of: (d) all landholder's active groundwater bores (subject to access being permitted by the landholder) that are spatially located within a two (2) kilometre horizontal radius from the location of the stimulation initiation point within the target gas producing formation; and (e) all landholders' active groundwater bores (subject to access being permitted by the landholder) in any aquifer that is within 200m 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 (f) any other bore that could potentially be adversely impacted by the stimulation activities in accordance with the findings of the risk assessment required by conditions (I9) and (I10).
(I13)	Prior to undertaking stimulation activities at a well, there must be sufficient water quality data to accurately represent the water quality in the well to be stimulated. The data must include as a minimum the results of analyses for the parameters in condition (I13).
(I14)	Baseline bore and well assessments must include relevant analytes and physico-chemical parameters to be monitored in order to establish baseline water quality and must include, but not necessarily be limited to: (a) pH (b) electrical conductivity [$\mu\text{S}/\text{m}$] (c) turbidity [NTU] (d) total dissolved solids [mg/L] (e) temperature [$^{\circ}\text{C}$] (f) dissolved oxygen [mg/L] (g) dissolved gases (methane, chlorine, carbon dioxide, hydrogen sulfide) [mg/L] (h) alkalinity (bicarbonate, carbonate, hydroxide and total as CaCO_3) [mg/L] (i) sodium adsorption ratio (SAR) (j) anions (bicarbonate, carbonate, hydroxide, chloride, sulphate) [mg/L]

	(k) cations (aluminium, calcium, magnesium, potassium, sodium) [mg/L] (l) dissolved and total metals and metalloids (including but not necessarily being limited to: aluminium, arsenic, barium, borate (boron), cadmium, total chromium, copper, iron, fluoride, lead, manganese, mercury, nickel, selenium, silver, strontium, tin and zinc) [µg/L] (m) total petroleum hydrocarbons [µg/L] (n) <u>BTEX</u> (as benzene, toluene, ethylbenzene, ortho-xylene, para- and meta-xylene, and total xylene) [µg/L] (o) polycyclic aromatic hydrocarbons (including but not necessarily being limited to: naphthalene, phenanthrene, benzo[a]pyrene) [µg/L] (p) sodium hypochlorite [mg/L] (q) sodium hydroxide [mg/L] (r) formaldehyde [mg/L] (s) ethanol [mg/L]; and (t) gross alpha + gross beta or radionuclides by gamma spectroscopy [Bq/L].
Stimulation Impact Monitoring Program	
(I15)	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: (e) the stimulation fluids to be used in stimulation activities at sufficient frequency and which sufficiently represents the quantity and quality of the fluids used (f) flow back waters from stimulation activities at sufficient frequency and which sufficiently represents the quality of that flow back water (g) flow back waters from stimulation activities at sufficient frequency and accuracy to demonstrate that 150% of the volume used in stimulation activities has been extracted from the stimulated well; and (h) all bores in accordance with condition (I11).
(I16)	The stimulation impact monitoring program must provide for monitoring of:

	(c) 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 (d) 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.
(I17)	The stimulation impact monitoring program must provide for monitoring of the bores in condition (I4(d)) at the following minimum frequency: (c) monthly for the first six (6) months subsequent to stimulation activities being undertaken; then (d) annually for the first five (5) years subsequent to stimulation being undertaken or until analytes and physico-chemical parameters listed in conditions (I13(a)) to (I13(t)) inclusive, are not detected in concentrations above baseline bore monitoring data on two (2) consecutive monitoring occasions.
(I18)	The results of the stimulation impact monitoring program must be made available to any potentially affected landholder upon request by that landholder.

Schedule J- Definitions

Key terms and/or phrases underlined in this environmental authority are defined in this section. Where a term is not defined, the definition in the *Environmental Protection Act 1994*, its regulations or environmental protection policies must be used. If a word remains undefined it has its ordinary meaning.

Term	Definition
acceptable standards for release to land	means wastewater of the following quality as determined by monitoring results or by characterisation: (f) electrical conductivity (EC) not exceeding 3000µS/cm (g) sodium adsorption ratio (SAR) not exceeding 8 (h) pH between 6.0 and 9.0 (i) heavy metals (measured as total) meets the respective short term trigger value in section 4.2.6, Table 4.2.10—Heavy metals and metalloids in Australian and New Zealand Guidelines for Fresh and Marine Water Quality (j) does not contain biocides.
acid sulfate soil(s)	means a soil or soil horizon which contains sulfides or an acid soil horizon affected by oxidation of sulfides.
adjacent land use(s)	means the <u>ecosystem function</u> 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: (d) for a matter, the administration and enforcement of which has been devolved to a local government under section 514 of the <i>Environmental Protection Act 1994</i>—the local government; or (e) for all other matters—the Chief Executive of the Department of Environment and Heritage Protection; or (f) 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(s)	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.														
annual return period	means the 12 month period from 1 January to 31 December in a calendar year.														
appraisal well	means a petroleum well to test the potential of one (1) or more natural underground reservoirs for producing or storing petroleum. For clarity, an appraisal well does not include an exploration well.														
appropriately qualified person / suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using relevant protocols, standards, methods or literature.														
approved quality criteria	for the purposes of residual drilling materials, means the residual drilling material meet the following quality standards: <u>Part A</u> In all cases: <table border="1"> <thead> <tr> <th>Parameter</th><th>Maximum concentration</th></tr> </thead> <tbody> <tr> <td>pH</td><td>6–10.5 (range)</td></tr> <tr> <td>Electrical Conductivity</td><td>20dS/m (20,000µS/cm)</td></tr> <tr> <td>Chloride*</td><td>8000mg/L</td></tr> </tbody> </table> *Chloride analysis is only required if an additive containing chloride was used in the drilling process The limits in Part A must be measured in the clarified filtrate of oversaturated solids prior to mixing. <u>Part B</u> If any of the following metals are a component of the drilling fluids, then for that metal: <table border="1"> <thead> <tr> <th>Parameter</th><th>Maximum concentration</th></tr> </thead> <tbody> <tr> <td>Arsenic</td><td>20mg/kg</td></tr> <tr> <td>Selenium</td><td>5mg/kg</td></tr> </tbody> </table>	Parameter	Maximum concentration	pH	6–10.5 (range)	Electrical Conductivity	20dS/m (20,000µS/cm)	Chloride*	8000mg/L	Parameter	Maximum concentration	Arsenic	20mg/kg	Selenium	5mg/kg
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Parameter	Maximum concentration														
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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
	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	
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.
associated works	in relation to a dam, means: (c) operations of any kind and all things constructed, erected or installed for that dam; and (d) any land used for those operations.
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.
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% of the measurement time period T of not less than 15 minutes (or <u>$L_{A 90, adj. 15 mins}$</u>), using Fast response.
bankfull	means the channel flow rate that exists when the water is at the elevation of the channel bank above which water begins to spill out onto the floodplain. The term describes the condition of the channel relative to its banks (e.g. overbank, in-bank, bankfull, low banks, high bank).
bed	of any waters, 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	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.
BTEX	means benzene, toluene, ethylbenzene, ortho-xylene, para-xylene, meta-xylene and total xylene.
Category A Environmentally Sensitive Area	means any area listed in Schedule 19, Part 1, section 1 of the <i>Environmental Protection Regulation 2019</i> .
Category B Environmentally Sensitive Area	means any area listed in Schedule 19, Part 1, section 2 of the <i>Environmental Protection Regulation 2019</i> .
Category C Environmentally Sensitive Area	means any of the following areas: • nature refuges as defined in the conservation agreement for that refuge under the <i>Nature Conservation Act 1992</i> • koala habitat areas as defined under the Nature Conservation (Koala) Conservation Plan 2006 • state forests or timber reserves as defined under the <i>Forestry Act 1959</i> • regional parks (previously known as resource reserves) under the <i>Nature Conservation Act 1992</i> • an area validated as 'essential habitat' from ground-truthing surveys in accordance with the <i>Vegetation Management Act 1999</i> for a species of wildlife listed as endangered or vulnerable under the <i>Nature Conservation Act 1992</i> • 'of concern regional ecosystems' that are remnant vegetation and identified in the database called 'RE description database' containing regional ecosystem numbers and descriptions.

certified or certification	in relation to any matter other than a design plan, 'as constructed' drawings or an annual report regarding dams means, a Statutory Declaration by a suitably qualified person or suitably qualified third party accompanying the written document stating: - the person's qualifications and experience relevant to the function - that the person has not knowingly included false, misleading or incomplete information in the document - that the person has not knowingly failed to reveal any relevant information or document to the administering authority - that the document addresses the relevant matters for the function and is factually correct; and - that the opinions expressed in the document are honestly and reasonably held.
clearing	has the meaning in the dictionary of the <i>Vegetation Management Act 2000</i> and for vegetation— (c) means remove, cut down, ringbark, push over, poison or destroy in any way including by burning, flooding or draining; but (d) does not include destroying standing vegetation by stock, or lopping a tree.
closed-loop systems	means using waste on site in a way that does not release waste or contaminants in the waste to the environment.
control measure	has the meaning in section 32 of the <i>Environmental Protection Regulation 2019</i> and means a device, equipment, structure, or management strategy used to prevent or control the release of a contaminant or waste to the environment.
critically limited regional ecosystem	means the regional ecosystems defined and listed in Appendix 5 of the Queensland Biodiversity Offset Policy.
coal seam gas water	means underground water brought to the surface of the earth, or moved underground in connection with exploring for, or producing coal seam gas.
daily peak design capacity	for sewage treatment works, has the meaning in Schedule 2, section 63(4) of the <i>Environmental Protection Regulation 2019</i> 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 <u>void</u> that contains, diverts or controls <u>flowable substances</u> , and includes any substances that are thereby contained, diverted or controlled by that land-based structure or void and <u>associated works</u> .

Prohibited and restricted pest species	means any pest that is: (a) a plant or animal, other than a native species of plant or animal, that is (i) invasive biosecurity matter under the Biosecurity Act 2014 (Qld); or Notes— 1 See the Biosecurity Act 2014, schedule 1, part 3 or 4 or schedule 2, part 2; and 2 See the note to the Biosecurity Act 2014, schedules 1 and 2. (ii) controlled biosecurity matter or regulated biosecurity matter under the Biosecurity Act 2014 (Qld) (iii) tramp ants listed in schedule 1 and schedule 2 of the Biosecurity Act 2014 (Qld) a pest declared under a local law by the local government for the Land to be a pest because the pest is causing, or has the potential to cause, an adverse environmental, economic or social impact in all or part of the local government area.
designated precinct	has the meaning in Part 5 section 15(3) of the Regional Planning Interests Regulation 2014 and means: - for a strategic environmental area mentioned in section 4(1) – the area identified as a designated precinct on the strategic environmental area map for the strategic environmental area; or - if a strategic environmental area is shown on a map in a regional plan – the area identified on the map as a designated precinct for the strategic environmental area.
design storage allowance or DSA	means an available volume, estimated in accordance with the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), published by the administering authority, as amended from time to time, that must be provided in a dam to an annual exceedance probability specified in that Manual.
development wells	means a petroleum well which produces or stores petroleum. For clarity, a development well does not include an appraisal well.
document	has the meaning in the <i>Acts Interpretation Act 1954</i> and means: - any paper or other material on which there is writing; and - any paper or other material on which there are marks; and - figures, symbols or perforations having a meaning for a person qualified to interpret them; and - any disc, tape or other article or any material from which sounds, images, writings or messages are capable of being produced or reproduced (with or without the aid of another article or device).

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 <i>Environmental Protection Act 1994</i> 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— (c) whether the harm is a direct or indirect result of the activity; or (d) 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 <i>Environmental Protection Act 1994</i> and means unreasonable interference or likely interference with an environmental value caused by— (d) aerosols, fumes, light, noise, odour, particles or smoke; or (e) an unhealthy, offensive or unsightly condition because of contamination; or (f) another way prescribed by regulation.
environmental offset	has the meaning in section 7 of the <i>Environmental Offsets Act 2014</i> .
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 of the Environmental Protection Regulation 2019 where: EP = $V/200$ where V is the volume, in litres, of the average dry weather flow of

	sewage that can be treated at the works in a day; or • $EP = M/2.5$ where M is the mass, in grams, of phosphorus in the influent that the works are designed to treat as the inlet load in a day.
essential petroleum activities	means activities that are essential to bringing the resource to the surface and are only the following: • <u>low impact</u> 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 ○ 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, produced 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 <i>Environmental Offsets Act 2014</i> .
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.
flare pit	has the meaning in the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), and means containment area where any hydrocarbon that is discovered in an over-pressured reservoir during a drilling operation is diverted to, and combusted, The flare pit is only used during the drilling and work over process on a petroleum well.
flare precipitant	means waste fluids which result from the operation of a flare.
floodplains	has the meaning in the <i>Water Act 2000</i> and means an area of reasonably flat land adjacent to a watercourse that— - is covered from time to time by floodwater overflowing from the watercourse; and - does not, other than in an upper valley reach, confine floodwater to generally follow the path of the watercourse; and - has finer sediment deposits than the sediment deposits of any bench, bar or in-stream island of the watercourse.
flowable substance	means matter or a mixture of materials which can flow under any conditions potentially affecting that substance. Constituents of a flowable substance can include water, other liquids fluids or solids, or a mixture that includes water and any other liquids fluids or solids either in solution or suspension.

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.
Great Artesian Basin (GAB) spring	means an area protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> 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. <i>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.</i> <i>Note: The GAB springs dataset can be requested from the Queensland Government Herbarium</i>
green waste	means waste that is grass cuttings, trees, bushes, shrubs, material lopped from trees, untreated timber or other waste that is similar in nature but does not include declared pest species.
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 dependent ecosystems do not include those mapped as "unknown".
growing	means to increase by natural development, as any living organism or part thereof by assimilation of nutriment; increase in size or substance.
hydraulic integrity	refers to the capacity of a dam to contain or safely pass <u>flowable substances</u> based on its design.

impulsive (for noise)	means sound characterised by brief excursions of sound pressure (acoustic impulses) that significantly exceed the background sound pressure. The duration of a single impulsive sound is usually less than one second.
L _A 90, adj, 15 mins	means the A-weighted sound pressure level, adjusted for tonal character that is equal to or exceeded for 90% of any 15 minutes sample period equal, using Fast response.
L _{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.
Land	Means the solid substance of the earth's surface.
land degradation	has the meaning in the <i>Vegetation Management Act 1999</i> 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.
landholder's active groundwater bore	means bores that are able to continue to provide a reasonable yield of water in terms of quantity for the bores authorised purpose or use. This term does not include monitoring bores owned by the administering authority of the <i>Water Act 2000</i> .
linear infrastructure	means powerlines, pipelines, flowlines, roads and access tracks.
liquid	means a substance which is flowing and offers no permanent resistance to changes of shape.
long term noise event	means a noise exposure, when perceived at a sensitive receptor, persists for a period of greater than five (5) days, even when there are respite periods when the noise is inaudible within those five (5) days.
low consequence dam	means any dam that is not classified as high or significant as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures, published by the administering authority, as amended from time to time.

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.
Max L_{pA} , 15 min	means the absolute maximum instantaneous A-weighted sound pressure level, measured over 15 minutes.
Max L_{pZ} , 15 min	means the maximum value of the Z-weighted sound pressure level measured over 15 minutes.
maximum extent of impact	means the total, cumulative, residual extent and duration of impact to a prescribed environmental matter that will occur over a project's life after all reasonable avoidance and reasonable on-site mitigation measures have been, or will be, undertaken.
medium term noise event	is a noise exposure, when perceived at a sensitive receptor, persists for an aggregate period not greater than five (5) days and does not re-occur for a period of at least four (4) weeks. Re-occurrence is deemed to apply where a noise of comparable level is observed at the same receptor location for a period of one hour or more, even if it originates from a difference source or source location.
methodology	means the science of method, especially dealing with the logical principles underlying the organisation of the various special sciences, and the conduct of scientific inquiry.
mix-bury-cover method	means the stabilisation of residual drilling solids in the bottom of a sump by mixing with subsoil and which occurs in accordance with the following methodology: - the base of the subsoil and residual solid mixture must be separated from the groundwater table by at least one metre of a continuous layer of impermeable subsoil material ($k_w=10-8\text{m/s}$) 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 <i>Acts Interpretation Act 1954</i> 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.
notice of election	has the meaning in section 18(2) <i>Environmental Offsets Act 2014</i> .
prescribed environmental matters	has the meaning in section 10 of the <i>Environmental Offsets Act 2014</i> , limited to the matters of State environmental significant listed in schedule 2 of the <i>Environmental Offsets Regulation 2014</i> .
pipeline waste water	means hydrostatic testing water, flush water or water from low point drains.
pre-disturbed land use	means the function or use of the land as documented prior to significant disturbance occurring at that location.
predominant species	has the meaning in the Methodology for Surveying and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Version 3.2 August 2012) and means a species that contributes most to the overall above-ground biomass of a particular stratum.
prescribed contaminants	has the meaning in section 440ZD of the <i>Environmental Protection Act 1994</i> and means:
primary protection zone	means an area within 200m from the boundary of any Category A, B or C ESA.
produced water	has the meaning in Section 15A of the <i>Petroleum and Gas (Production and Safety) Act 2004</i> and means CSG water or <u>associated water</u> for a petroleum tenure.
protection zone	means the primary protection zone of any Category A, B or C ESA or the secondary protection zone of any Category A or B ESA.
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.
regulated dam	means any dam in the significant or high consequence category as assessed using the Manual for Assessing Consequence Categories and Hydraulic Performance of Structures (EM635), published by the administering authority, as amended from time to time.
rehabilitation or rehabilitated	means the process of reshaping and revegetating land to restore it to a stable landform and in accordance with acceptance criteria and, where relevant, includes remediation of contaminated land. For the purposes of pipeline rehabilitation, rehabilitation includes reinstatement, revegetation and restoration.
reinstate or reinstatement	for pipelines, means the process of bulk earth works and structural replacement of pre-existing conditions of a site (i.e. soil surface 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 (2017).
reporting limit	means the lowest concentration that can be reliably measured within specified limits of precision and accuracy during routine laboratory operating conditions. For many analytes, the reporting limit is selected as the lowest non-zero standard in the calibration curve. Results that fall below the reporting limit will be reported as “less than” the value of the reporting limit. The reporting limit is also referred to as the practical quantitation limit or the limit of quantitation. For polycyclic aromatic hydrocarbons, the reporting limit must be based on super-ultra trace methods and, depending on the specific polycyclic aromatic hydrocarbon, will range between 0.005 ug/L–0.02 ug/L.
residual drilling material	means waste drilling materials including muds and cuttings or cement returns from well holes and which have been left behind after the drilling fluids are pumped out.
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 <u>analogue</u> 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 <i>Environmental Protection Act 1994</i> and means fluids used for the purpose of stimulation, including fracturing, that contain the following chemicals in more than the maximum amount prescribed under a regulation— (c) petroleum hydrocarbons containing benzene, ethylbenzene, toluene or xylene (d) chemicals that produce, or are likely to produce, benzene, ethylbenzene, toluene or xylene as the chemical breaks down in the environment.

revegetation or revegetating or revegetate	means to actively re-establish vegetation through seeding or planting techniques in accordance with site specific management plans.
secondary protection zone	in relation to a Category A or Category B ESA means an area within 100 metres from the boundary of the primary protection zone.
secondary treated class A standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • total nitrogen as N, maximum 30mg/L • 5-day biochemical oxygen demand (inhibited) (e.g. release pipe from sewage treatment plant), maximum 20mg/L • suspended solids, maximum 30mg/L • pH, range 6.0 to 8.5 • e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 100cfu per 100mL, maximum 1000cfu per 100mL.
secondary treated class B standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • total nitrogen as N, maximum 30mg/L • 5-day biochemical oxygen demand (inhibited) (e.g. release pipe from sewage treatment plant), maximum 20mg/L • suspended solids, maximum 30mg/L • pH, range 6.0 to 8.5 • e-coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 1000cfu per 100mL, maximum 10 000cfu per 100mL.
secondary treated class C standards	means treated sewage effluent or greywater which meets the following standards: • total phosphorous as P, maximum 20mg/L • total nitrogen as N, maximum 30mg/L • 5-day biochemical oxygen demand (inhibited) (e.g. Release pipe from sewage treatment plant), maximum 20mg/L • suspended solids, maximum 30mg/L • pH, range 6.0 to 8.5

	e-Coli, 80th percentile based on at least 5 samples with not less than 30 minutes between samples, 10 000cfu per 100mL, maximum 100 000cfu per 100mL.
sensitive place	means: - a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel) - 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 <i>Environmental Protection (Noise) Policy 2019</i>.
sensitive receptor	is defined in Schedule 2 of the <i>Environmental Protection (Noise) Policy 2019</i> , 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 <i>Environmental Offsets Act 2014</i> .
significantly disturbed or significant disturbance or significant disturbance to land or areas	means Land is <i>significantly disturbed</i> 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. Without limiting subsection (1)(b), land requires human intervention to rehabilitate it if— (a) the disturbance has made the land more susceptible to erosion; or (b) the land use capability or suitability of the land is diminished; or (c) the quality of water in a watercourse downstream of the land has been significantly reduced.
species richness	means the number of different species in a given area.
stable	means the rehabilitation and <u>restoration</u> of the site is enduring or permanent so that the site is unlikely to collapse, erode or subside.
statement of compliance	for a condition in an environmental authority has the meaning in section 208 of the <i>Environmental Protection Act 1994</i> and is a condition that requires the holder to give the administering authority a statement of compliance about a document or work relating to a relevant activity. The condition must also state— (a) the criteria (the compliance criteria) the document or work must comply with; and (b) that the statement of compliance must state whether the document or work complies with the compliance criteria; and (c) the information (the supporting information) that must be provided to the administering authority to demonstrate compliance with the compliance criteria; and (d) when the statement of compliance and supporting information must be given to the administering authority.
stimulation	means a technique used to increase the permeability of natural underground reservoir that is undertaken above the formation pressure and involves the addition of chemicals. It includes hydraulic fracturing / hydrofracting, fracture acidizing and the use of proppant treatments. Explanatory note: This definition is restricted from that in the <i>Petroleum and Gas (Production and Safety) Act 2004</i> in order to only capture the types of stimulation activities that pose a risk to environmental values of water quality in aquifers.
stimulation fluid	means the fluid injected underground to increase permeability. For clarity, the term stimulation fluid only applies to fluid injected down well post-perforation.

stimulation impact zone	means a 100m maximum radial distance from the stimulation target location within a gas producing formation.
strategic environmental area	has the meaning in section 11(1) of the <i>Regional Planning Interest Act 2014</i> .
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 and identified in the Queensland Government Information System, as amended from time to time; and - means a cave ecosystem which requires access to groundwater on a permanent or intermittent 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 WetlandsInfo mapping program, as amended from time to time. <i>Note: the Subterranean GDE (caves) dataset can be displayed through the Queensland Government WetlandsInfo mapping program.</i> <i>Note: the Subterranean GDE (caves) dataset can be obtained from the Queensland Government Information System.</i>
suitably qualified person	means a person who has professional qualifications, training or skills or experience relevant to the nominated subject matters and can give authoritative assessment, advice and analysis about performance relevant to the subject matters using 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: iii. a bachelor's degree in science or engineering; and iv. 3 years' experience in undertaking soil contamination assessments; and (b) is a member of at least one organisation prescribed in Schedule 14 of the Environmental Protection Regulation 2019; and (c) not be an employee of, nor have a financial interest or any involvement which would lead to a conflict of interest with the holder(s) of the environmental authority.

sump	means a pit in which waste residual drilling material or drilling fluids are stored only for the duration of drilling activities.
synthetic based 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.
top soil	means the surface (top) layer of a soil profile, which is more fertile, darker in colour, better structured and supports greater biological activity than underlying layers. The surface layer may vary in depth depending on soil forming factors, including parent material, location and slope, but generally is not greater than about 300mm in depth from the natural surface.
total density of coarse woody material	means the total length of logs on the ground greater than or equal to 10cm diameter per hectare and number of logs on the ground greater than or equal to 10cm diameter per hectare.
transmissivity	means the rate of flow of water through a vertical strip of aquifer which is one unit wide and which extends the full saturated depth of the aquifer.
valid complaint	means all complaints unless considered by the administering authority to be frivolous, vexatious or based on mistaken belief.
void	means any constructed, open excavation in the ground.
waste and resource management hierarchy	has the meaning provided in section 9 of the <i>Waste Reduction and Recycling Act 2011</i> and is the following precepts, listed in the preferred order in which waste and resource management options should be considered— (a) AVOID unnecessary resource consumption (b) REDUCE waste generation and disposal (c) RE-USE waste resources without further manufacturing (d) RECYCLE waste resources to make the same or different products (e) RECOVER waste resources, including the recovery of energy (f) TREAT waste before disposal, including reducing the hazardous nature of waste (g) DISPOSE of waste only if there is no viable alternative.
waste and resource	has the meaning provided in section 4(2)(b) of the <i>Waste Reduction and Recycling Act 2011</i> and means the: (a) polluter pays principle

management principles	(b) user pays principle (c) proximity principle (d) product stewardship principle.
waste fluids	has the meaning in section 13 of the <i>Environmental Protection Act 1994</i> in conjunction with the common meaning of “fluid” which is “a substance which is capable of flowing and offers no permanent resistance to changes of shape”. Accordingly, to be a waste fluid, the waste must be a substance which is capable of flowing and offers no permanent resistance to changes of shape.
watercourse	has the meaning in Schedule 4 of the <i>Environmental Protection Act 1994</i> and means: 1) a river, creek or stream in which water flows permanently or intermittently— (a) in a natural channel, whether artificially improved or not; or (b) in an artificial channel that has changed the course of the watercourse. 2) Watercourse includes the bed and banks and any other element of a river, creek or stream confining or containing water.
waters	includes all or any part of a creek, river, stream, lake, lagoon, swamp, wetland, spring, unconfined surface water, unconfined water in natural or artificial watercourses, bed and bank of any waters, non-tidal or tidal waters (including the sea), stormwater channel, stormwater drain, roadside gutter, stormwater run-off, and underground water.
well integrity	the ability of a well to contain the substances flowing through it.
wetland	for the purpose of this environmental authority, wetland means: an area shown as a wetland on the map of Queensland Wetland Environmental Values. <i>Note: The Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 2, Map of Queensland Wetland Environmental Values means the document ‘Map of Queensland Wetland Environmental Values’ made by the Chief Executive and published on the website.</i> <i>Environmental values in section 8 of the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 apply to wetland areas on the map, which are categorised as wetlands of high or general ecological significance.</i>
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 wetland of ‘high ecological value’ on the Map of Queensland wetland environmental values

wetland of general environmental significance	means a wetland that meets the definition of a wetland and that is shown as a wetland of 'general environmental significance' or wetland of 'other environmental value' on the Map of Queensland wetland environmental values.
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END OF ENVIRONMENTAL AUTHORITY